



Division of Forensic Science 2019 Annual Report

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Department of Safety and Homeland Security
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DEPARTMENT OF SAFETY AND HOMELAND SECURITY
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The Honorable John Carney
Governor

The Honorable Kimberly H. Chandler
Acting Cabinet Secretary

May 7, 2020

To the Citizens of Delaware:

I am honored to recognize the outstanding work of the men and women of the Division of Forensic Science (DFS) detailed in this year's annual report. While their dedication and professionalism, has resulted in numerous accomplishments, I will only highlight a few.

First, the Division completed a major renovation of the Wilmington Medical Examiner's Morgue and Autopsy Suite. This project, which started in 2018, provided a new dedicated negative pressure HVAC system, separate from the shared HVAC system currently in the building as well as new body coolers, autopsy workstations and epoxy flooring. With these new upgrades, the Medical Examiner's Office not only has a new and improved workspace but also received national reaccreditation for four more years.

A second significant accomplishment was the result of much hard work within the Chemistry Unit. The Unit continued to work at full capacity even with significant staff changes that required the hiring and training of several new chemists. Even with the personnel challenges, the Unit continued to process cases from all Delaware law enforcement agencies.

Finally, this annual report contains important statistics on drug overdose deaths, autopsies, post-mortem death trends, and the increased complexity of driving under the influence (DUI) cases. These statistics highlight the importance of each Unit within the Division.

Please join me in extending sincere thanks to the DFS team for a year filled with many successes.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kimberly H. Chandler".

Kimberly H. Chandler
Secretary



STATE OF DELAWARE
DEPARTMENT OF SAFETY AND HOMELAND SECURITY
DIVISION OF FORENSIC SCIENCE
200 South Adams Street, Wilmington, DE 19801
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The Honorable John Carney
Governor

The Honorable Robert Coupe
Cabinet Secretary

To My Fellow Delawareans:

On behalf of the men and women of the Division of Forensic Science (DFS), I am proud to present the 2019 Annual Report, which highlights the outstanding work and critical role that the DFS plays in the criminal justice process in Delaware.

The Mission of the DFS is to provide the most reliable scientific analysis of evidence for the administration of justice. Sound and timely pathology and forensic science services are provided for the justice system, driven by crimes committed and deaths occurring in the State of Delaware.

The organizational structure of the Division is a collaborative model where each discipline is equally invested in the overall success of the Division. A stratified model of accountability is used, where each team member has a specific role toward meeting the overall mission.

By continuing to meet accreditation standards and certifications, the DFS maintains the highest scientific standards and ensures both organizational and individual integrity. The work ethic of the employees of the DFS is strong and we hold true to our core values of Integrity, Honesty, Thoroughness, Timeliness and Professionalism.

The number of case submissions in 2019 continued to increase in the Toxicology, Forensic Chemistry and Medical Examiner Units. There was a slight decrease (5%) in the DNA caseload. The dedicated staff not only met the continued increased demands experienced in 2019, but due to their efficiency, were able to maintain turnaround times on test results at acceptable levels. The morgue renovation project was completed in 2019, which resulted in a state-of-the-art autopsy suite, providing a safer and more efficient work environment for the staff and our partners.

Coupled with our data sharing, the Division continues to pursue grant opportunities allowing the DFS to increase our drug testing capabilities to combat the ongoing opioid epidemic. As an example, in 2019, the Toxicology Unit completed two major projects. The Alcohol/Volatiles validation project has decreased the lower limit of quantitation for ethanol and other volatiles. The second project, which concluded in August, was the Amphetamine-type Stimulants and Bupropion Confirmation and Quantitation by LC-MS/MS validation. With this method, we can now quantitate 12 more drugs and detect seven more drugs qualitatively.

I would like to thank the members of the Commission on Forensic Science for their dedication and commitment to providing oversight and guidance to foster professionalism within, and the development and growth of, the Division of Forensic Science. I am confident that with the continued work of the Commission and with the support of Governor John Carney and the General Assembly, the forward momentum of the Division of Forensic Science will continue in 2020.

I take great pride in the hard work and dedication of the men and women of the Division of Forensic Science and for their continued focus on providing the level of service that our customers and stakeholders deserve and expect. I remain confident that our staff will meet any challenge in order to fulfill our mission.

Sincerely,

A handwritten signature in black ink, appearing to read "John R. Evans". The signature is fluid and cursive, with the first name "John" being the most prominent.

John R. Evans, Director

The Division of Forensic Science

The Delaware Division of Forensic Science (DFS) was established on June 24, 2014 with the signing of Senate Bill 241 by Governor Jack Markell. Retired Senator Robert I. Marshall was the primary sponsor of the legislation with broad bi-partisan support in both the Senate and House. The bill reassigned

forensic and pathology examinations, formerly performed by the Office of the Chief Medical Examiner (OCME) within the Department of Health and Social Services (DHSS), to the Department of Safety and Homeland Security (DSHS), Division of Forensic Science.



Division of Forensic Science, Wilmington, DE

The Division is comprised of four disciplines including the Medical Examiner, Toxicology, DNA, and Forensic Chemistry. In addition, a Commission on Forensic Science was created by this legislation. The Commission is charged with providing oversight and guidance to ensure professionalism and integrity within the DFS and to support development and growth that better serves the justice system.

During 2019, the DFS continued to enhance operations and administration, embracing every challenge as an opportunity to improve. The DFS has maintained accreditation with the ANSI National Accreditation Board (ANAB). Additionally, the Medical Examiner Unit continues to be accredited through the National Association of Medical Examiners (NAME) and the Toxicology Unit through the American Board of Forensic Toxicology (ABFT). The dedicated staff at the DFS continues to demonstrate a professional commitment to providing accurate, timely, and responsive forensic science service to all members of the criminal justice community in Delaware.



2019 DFS Organizational Chart. (Note that vacant positions are included in totals.)

Divisional Initiatives, Collaboration, and Information Sharing

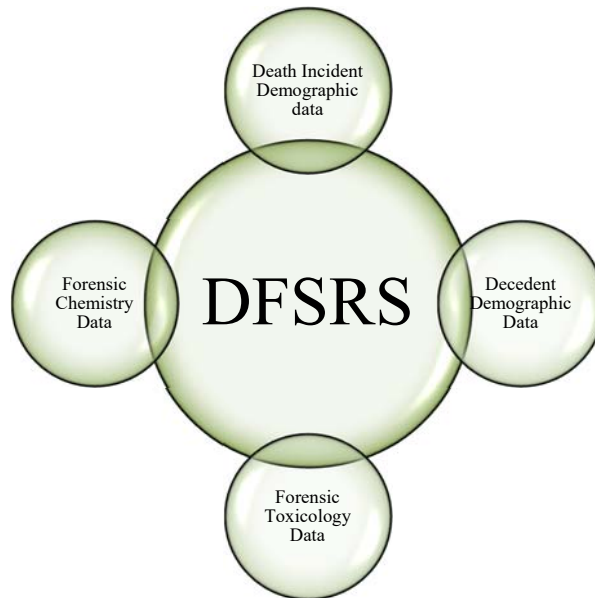
Overview

The Division of Forensic Science believes that sharing of data and DFS information adds value to multiple governmental and academic initiatives. Working together across agencies, federal and state governments, and other stakeholder organizations supports the health and safety of all who we serve. Currently, DFS participates on two statewide commissions related to child death and overdose death, two CDC funded projects, the Delaware Drug Monitoring Initiative, the Delaware Substance Abuse Strategic Planning team, and several other forensic data driven projects with both our public health and law enforcement partners.

To forward the mission, the Division is continuously working on a comprehensive reporting system aimed at producing standardized information to key government and private sector stakeholders statewide. This work is identified as the Delaware Forensic Science Reporting Project (DFSRRP).

DFSRRP- Delaware Forensic Science Reporting System

Delaware Forensic Science Reporting System (DFSRS) is a comprehensive reporting project aimed at producing standardized information to key government and private sector stakeholders statewide. DFSRS is a component of research conducted within the Division of Forensic Science under the Department of Safety and Homeland Security. DFSRS aims to provide consistent, reliable scientific data related to toxicology, forensic chemistry, and death related investigations to assist in law and health related initiatives statewide. This work provides a common platform for all operational and clinical data within the Division of Forensic Science.



DFSRS Model

Incident Demographic Dataset is a data retrieved from the Pathology Unit. It includes data points such as: date, ME number, notification time, incident arrival times, responding agencies, incident address, and location type (home, business, accident scene, hospital, etc.). This information can be linked to OEMS, PMP and DELJIS data¹.

¹ Delaware State offices abbreviated are: OEMS – Office of Emergency Medical Services; PMP – Prescription Monitoring Program through the Division of Professional Regulations; and DELJIS – Delaware Criminal Justice Information System.

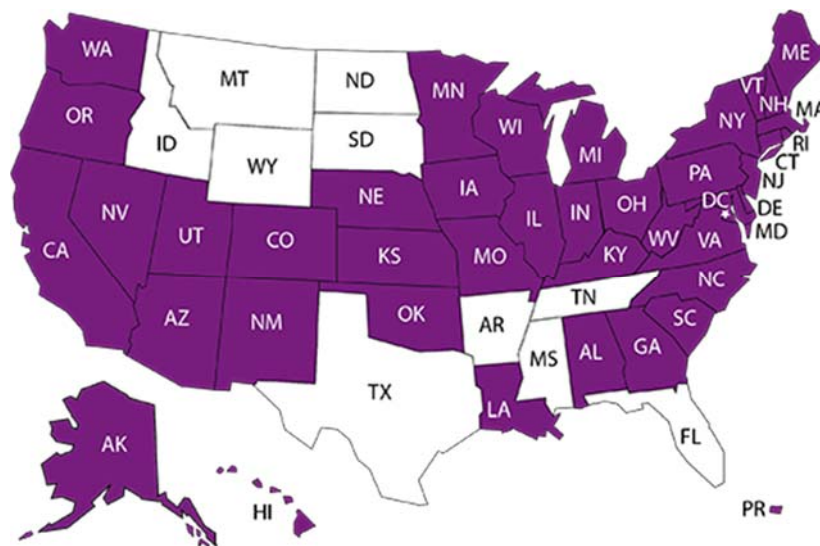
Decedent Demographic Dataset is data retrieved from the Pathology Unit. It includes data points such as: name, race, ethnicity, age, date of birth, gender, home address, past medical history, medications, allergies, cause and manner of death. A unique identifier can be assigned to each decedent.

Forensic Toxicology Dataset is data retrieved from the Forensic Toxicology Unit. It includes data related to toxicology results of decedents. This data set takes an estimated 30-60 days for the casework to be completed and released by the Chief Toxicologist.

Forensic Chemistry Dataset is data retrieved from the Forensic Chemistry Unit. It includes data related to drug testing and may take up to 90 days to complete casework before the dataset can be populated.

National Violent Death Reporting System

DFS is a key partner in the National Violent Death Reporting System (NVDRS), managed by epidemiology researchers with the Delaware Division of Public Health; Delaware Violent Death Reporting System (DVDRS). This funded project was approved in 2016 and is ongoing. Created by the Centers for Disease Control and Prevention (CDC) in 2002, the NVDRS is a surveillance system that pulls together data on violent deaths in 40 states, including Delaware and the surrounding states (see map below).



(Borrowed from CDC, NVDRS State Profiles, 2018)

The National Violent Death Reporting System (NVDRS) provides states and communities with a clearer understanding of violent deaths. This information guides decisions by policy makers regarding efforts to prevent violence and track progress over time. NVDRS is the only state-based surveillance system that gathers data on violent deaths from multiple sources. The NVDRS is incident-based system that links victims and alleged perpetrators with a given incident in one record. This work requires abstractors to

collect key data from the DFS for the purposes of supporting effective prevention strategies to reduce violent deaths in Delaware.

Centers for Disease Control Biorepository Program

Since 2016 DFS has continued to partner with the Child Death Review Commission for the collection of biological samples as part of the funded sudden death in the youth (SDY) CDC reporting project. DFS works with the SDY Registry to submit certain cases for DNA sampling as part of the grant requirement. DNA samples are then shipped to the University of Michigan SDY Biorepository. Forensic Investigators work with family members to obtain consent so that the DNA sample will be available for sudden child death research, and also to provide valuable information for the health and well-being of surviving siblings. The data and samples are used to create a resource that will be used by the National Institute of Health funded researchers to investigate SDY. An overhaul of the Child Death Review program was performed in late 2015, and as a result Delaware has seen improvements in data surveillance. These efforts are continuously monitored for efficiency and improvement. This vital work is being conducted through the collaborative efforts of the staff at the Child Death Review Commission and DFS to identify causes of sudden death in our Delaware Children.

Delaware Drug Monitoring Initiative

In 2016 a team of individuals from the State of Delaware were selected to participate in a learning lab with the National Governors Association (NGA) in Washington DC. Delaware was one of only four states chosen to receive grant funding to examine methods for information sharing across state departments and divisions. The Division of Forensic Science collaborated with the Office of Emergency Medical Services (OEMS), the Delaware Information & Analysis Center (DIAC) and the Division of Substance Abuse and Mental Health (DSAMH). The result of this collaborative effort produced a report that is now being distributed quarterly to stakeholders both statewide and federally.

The Delaware Drug Monitoring Initiative (DMI) utilizes data derived from the Delaware Forensic Science Reporting System (DFSRS), Delaware Emergency Medical Reporting System (DEMRS), Delaware Information and Analysis Center (DIAC), and the Delaware Division of Substance Abuse and Mental Health (DSAMH) to be used for situational awareness. The purpose of this initiative is to share consistent, actionable information to address the issues related to the drug epidemic affecting Delaware. The data provided in this report is aimed at assisting multiple agencies across Delaware in an effort to identify those in jeopardy of addiction and/or overdose. These efforts will help inform both law enforcement and public health officials as they work to identify additional treatment needs or programs. While all the data is housed under the respective agencies, the DMI report is created collaboratively

within the DIAC for broader reach to key stakeholders. This work has opened the door for collaborative reporting statewide.

Disaster Preparation

In 2016 the Division of Forensic Science worked with partners at the Division of Public Health Emergency Medical Services and Preparedness Section to finalize a statewide Mass Fatality Plan. This plan was finalized and executed in September of 2016. As part of this ongoing effort to be prepared, the Division of Forensic Science has participated in table-top disaster drills and on-scene disaster drills. The purpose of these exercises was to identify areas of strength and weakness, and to test the Mass Fatality Plan before the occurrence of a state disaster. As part of this work, DFS has developed internal Critical Incident Standard Operating Guidelines (SOG). These guidelines provide DFS staff with a framework for emergency operations that falls within the scope of other statewide disaster plans.

The second step of disaster preparation is the development of a statewide Family Assistance Center (FAC) plan. This plan is being modeled after the National Transportation & Safety Board efforts to promote a centralized location for multiple agencies to assist families during a disaster. This plan is nearing completion.

Overall Reporting & Collaboration

One of the efforts that the Division of Forensic Science encourages is the sharing of information with stakeholders and government agencies in Delaware. This is accomplished by successful collaboration, and participation on commissions and other data analysis efforts across State departments and agencies. We work closely with the Department of Health & Social Services, the Division of Public Health, the Department of Justice, DIAC, and other law enforcement organizations statewide to accomplish this mission.

The Division has also increased our academic interface with the Delaware academic community by opening our doors to tours, promoting forensic internship programs, and participating in quality data collection and research. The Division firmly believes these efforts will promote interest in forensic science disciplines among Delaware students and lead to stronger information sharing projects.

Overall, these external relationships have two goals: to promote confidence in the Division of Forensic Science by demonstrating transparency in forensic principles and processes and to establish the Division as a key contributor across state agencies for the development of policies and initiatives to safeguard the health and safety of all Delawareans.

Community Engagement

One of the goals of the Division is to engage community partners by providing informational resources and encouraging scientific learning. In 2019 DFS staff members gave presentations to multiple government and private organizations, attended several high school events, gave university lectures, conducted facility tours, and provided agency-based education related to the work of this Division. The professional staff of the Division of Forensic Science is committed to promoting scientific knowledge and community collaborations.

Assessment, Accreditation, and Quality Assurance

Accreditation is a key component of the quality assurance program at the DFS. To be accredited means that the various units within the DFS are routinely inspected by outside organizations who ensure that the policies, procedures, and/or practices within the Division adhere to strict national or international standards. Standards followed by the DFS include those set forth by the International Organization for Standardization (ISO), the American National Standards Institute National Accreditation Board (ANAB), the American Board of Forensic Toxicology (ABFT), the National Association of Medical Examiners (NAME), and the Quality Assurance Standards (QAS) established by the Federal Bureau of Investigation (FBI).

ISO 17025:2005 Accreditation

The International Organization for Standardization is the world's largest developer and publisher of international standards. Laboratories use ISO 17025 to implement a quality system aimed at improving their ability to consistently produce valid results. Since the standard is about competence, accreditation is a formal recognition of the demonstration of that competence.

The DFS was originally ISO 17025 accredited in 2004 and has continually achieved the highest level of quality standard competency for testing with annual re-accreditation. The current ISO 17025 accreditation was provided by ANAB, which also publishes additional standards that must be adhered to for accreditation, and is scheduled to expire on October 31, 2020.

American Board of Forensic Toxicology Accreditation

ABFT is dedicated to enhancing and maintaining standards of practice in the field of forensic toxicology.

The toxicology laboratory at the DFS received a Certificate of Laboratory Accreditation in Forensic Toxicology by the ABFT on July 1, 2018, which will expire on July 1, 2020.

National Association of Medical Examiners Accreditation

The purpose of the NAME accreditation standards is to improve the quality of the medicolegal investigation of deaths in this country. NAME accreditation is an endorsement by NAME that the Division provides an adequate environment for medical examiners to practice their profession and offers reasonable assurances that the ME office serves its jurisdiction well.

The DFS has been NAME accredited since 1980 and continues to be in good standing with this organization. The current NAME accreditation expires January 16, 2023.

FBI Quality Assurance Standards

The FBI's Quality Assurance Standards (FBI QAS) describe the requirements that laboratories performing forensic DNA testing or utilizing the Combined DNA Index System (CODIS) shall follow to ensure the quality and integrity of the data generated by the laboratory. The DFS has been compliant with the FBI QAS since 1997.

Medical Examiner Unit

Overview

The duties of death investigation for the State of Delaware fall to the Medical Examiner Unit (MEU), led by the Chief Medical Examiner (ME), Assistant MEs, Forensic Morgue Assistants, and Forensic Investigators. This Unit is responsible for investigating all suspicious and violent deaths in the State and performs postmortem examinations on cases that fall under its jurisdiction. The Unit operates out of three locations: the main office in Wilmington, the Tobin Building on the Stockley campus in Georgetown, and a satellite office in the Tatnall Building in Dover (Kent County).

The first half of 2019 started with the completion of the Wilmington morgue renovations. The renovations were concluded in May and full operations resumed in Wilmington in June 2019. In August 2019 the Wilmington and Georgetown offices were inspected for accreditation by the National Association of Medical Examiners and the facilities and operations passed the inspections and Accreditation was awarded to DFS-MEU for an additional 4 years.

The number of deaths investigated by the MEU continued to increase in 2019. This increase was again attributed to the increase in deaths related to drug use. Statewide, deaths from drug and alcohol intoxication increased by approximately 10% from 400 in 2018 to 438 in 2019. In 2018, the MEU investigated 2685 reports of death and accepted jurisdiction of approximately 53% of these cases. In 2019 the MEU certified 1446 deaths, which represented 16% of all deaths registered by the State of Delaware.

	2016	2017	2018	2019
Autopsies	649	610	690	707
Inspections	329	307	296	289
Total Examinations	978	917	986	996
Inquiries*	305	386	381	450
Total Deaths Certified	1283	1303	1367	1446
Non-Jurisdiction Investigations*	816	875	927	1239
Total Medical Death Investigations	2099	2178	2294	2685
*Note that inquiries are cases under the ME jurisdiction which did not require an examination, and non-jurisdiction cases are investigated but determined not to be under ME jurisdiction.				

The Medical Examiner is involved in collaboration with organ and tissue organ procurement organization to approve organ and tissue donations in Delaware. In 2019 the DFS-MEU collaborated with Gift Life to recover organs and tissues from 282 donors. Organs procured included heart, liver, kidneys, lungs, and pancreas. Tissues procured included cornea, skin, long bones, heart valves, and veins.

Training and Outreach

The Division continues to promote education and training among the staff in the MEU. As part of our community involvement, several of our Forensic Investigators are actively involved in outreach educational activities with local police departments and police academies, fire and paramedic training programs, as well as hospital-based training programs. Many staff members have attended local and national conferences such as: The Delaware State Police Homicide Conference, the New England Seminar in Forensic Sciences, and the American Academy of Forensic Sciences Annual Conference. The pathologists maintain board certification and licensure requirements by participating in educational activities geared toward physician best practices. Our physicians have attended conferences sponsored by the American Society of Clinical Pathology, National Association of Medical Examiners, and the International Homicide Investigators Association. The MEU is also active in our academic community by participating in presentations and providing internship and training opportunities to undergraduate students at University of Delaware and to residents of Delaware enrolled in other tertiary institutions. In 2019, members of the unit attended and made presentations at national and international forensic medicine and pathology conferences. Conferences included the National Association of Medical Examiner Scientific Conference, Annual Pediatric Pathology Conference and Caribbean Medicolegal and Forensic Symposium.

The unit continues to collaborate with other DFS staff in multiple mortality review committees and research projects. These projects utilize data collected from death investigations and other units to aid in

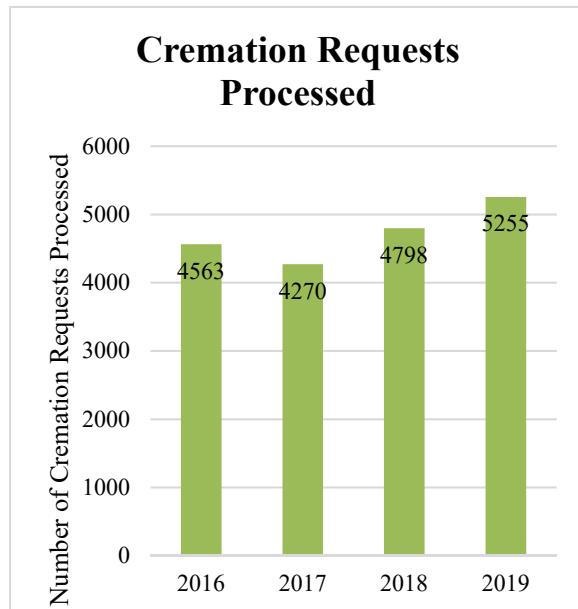
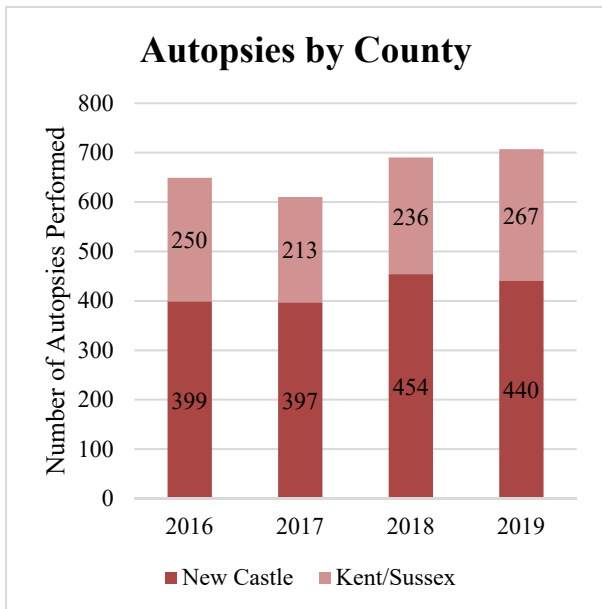
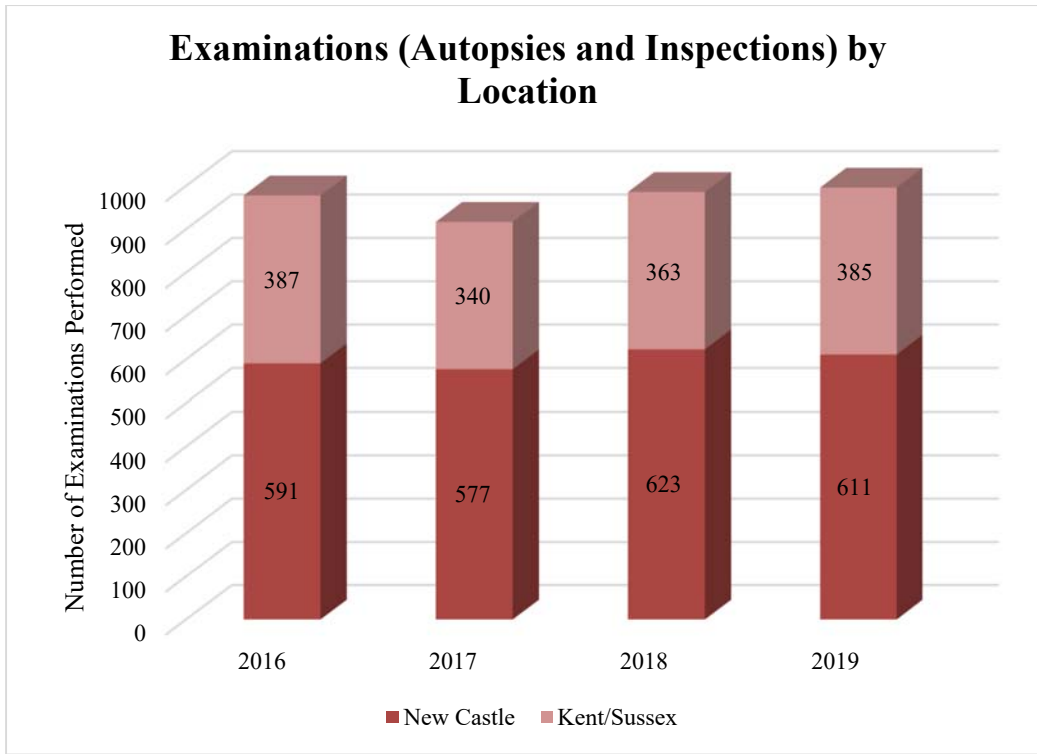
disease and injury prevention, disease surveillance programs, health improvement programs, and addiction prevention and treatment programs. Some of the agencies and program collaborators include the Division of Public Health, the CDC-funded Sudden Death in Youth (SDY) project, National Violent Death Reporting System, and the State of Delaware Child Death Review Panel and Maternal Mortality Review Panel. Other Federal agencies that have partnered with DFS include the Consumer Product Safety Commission (CPSC) and the Occupational Safety and Health Administration (OSHA).

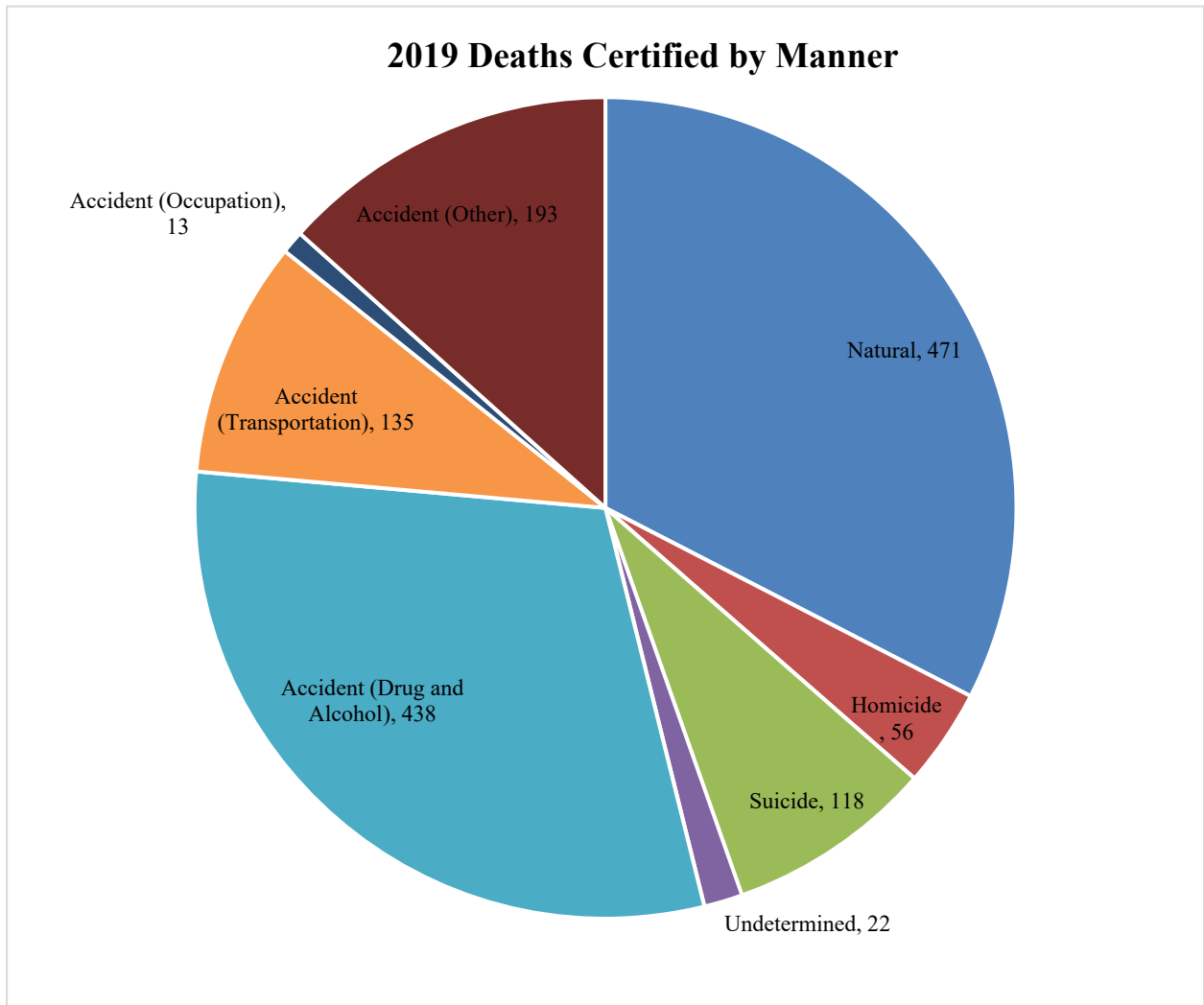
Partners

The MEU could not accomplish our mission without the support of the Department of Safety and Homeland Security and the Delaware General Assembly. In addition, it is important to note the many agencies who assist in providing services to the MEU. These agencies include: Delaware law enforcement agencies, the Attorney General's Office, Office of the Child Advocate, the staff of all our Delaware hospitals, the Delaware Funeral Directors Association, the Gift of Life Donor Program, the Office of Vital Statistics, and all the funeral homes and health care practices that work with the Division. The MEU and Division values our relationships with all of these agencies.

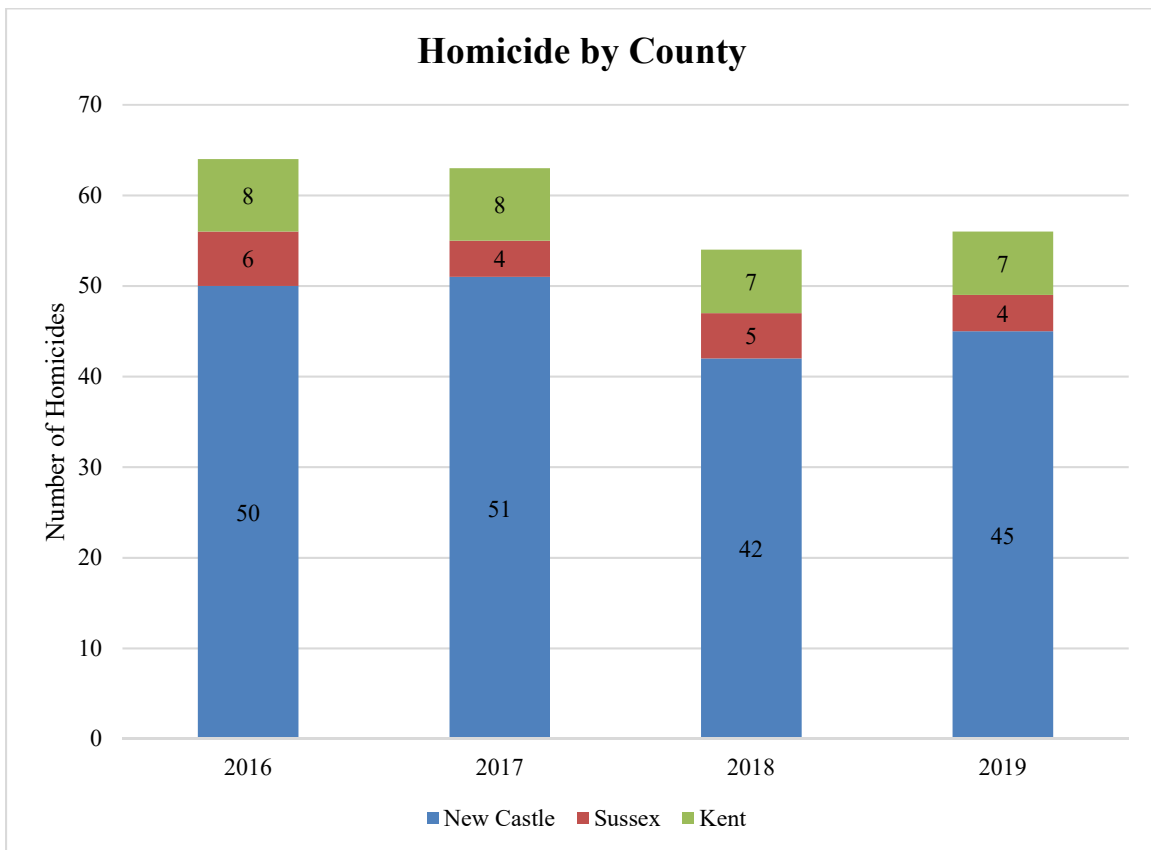
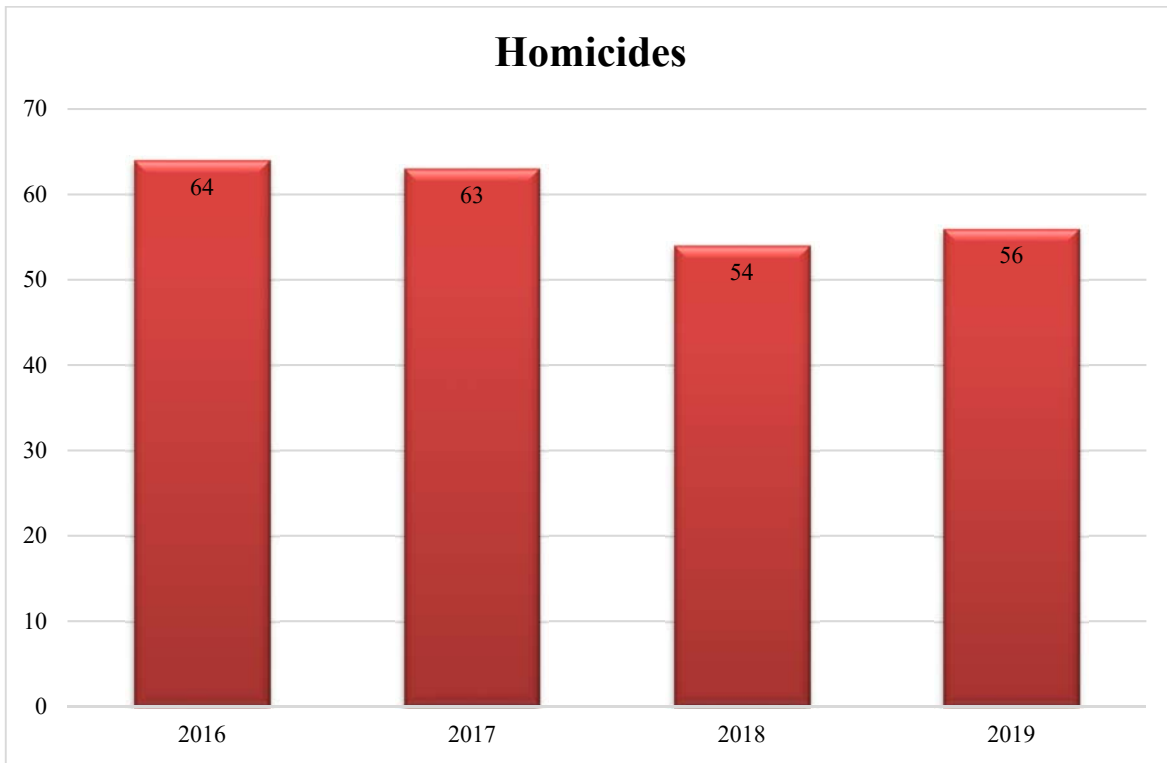
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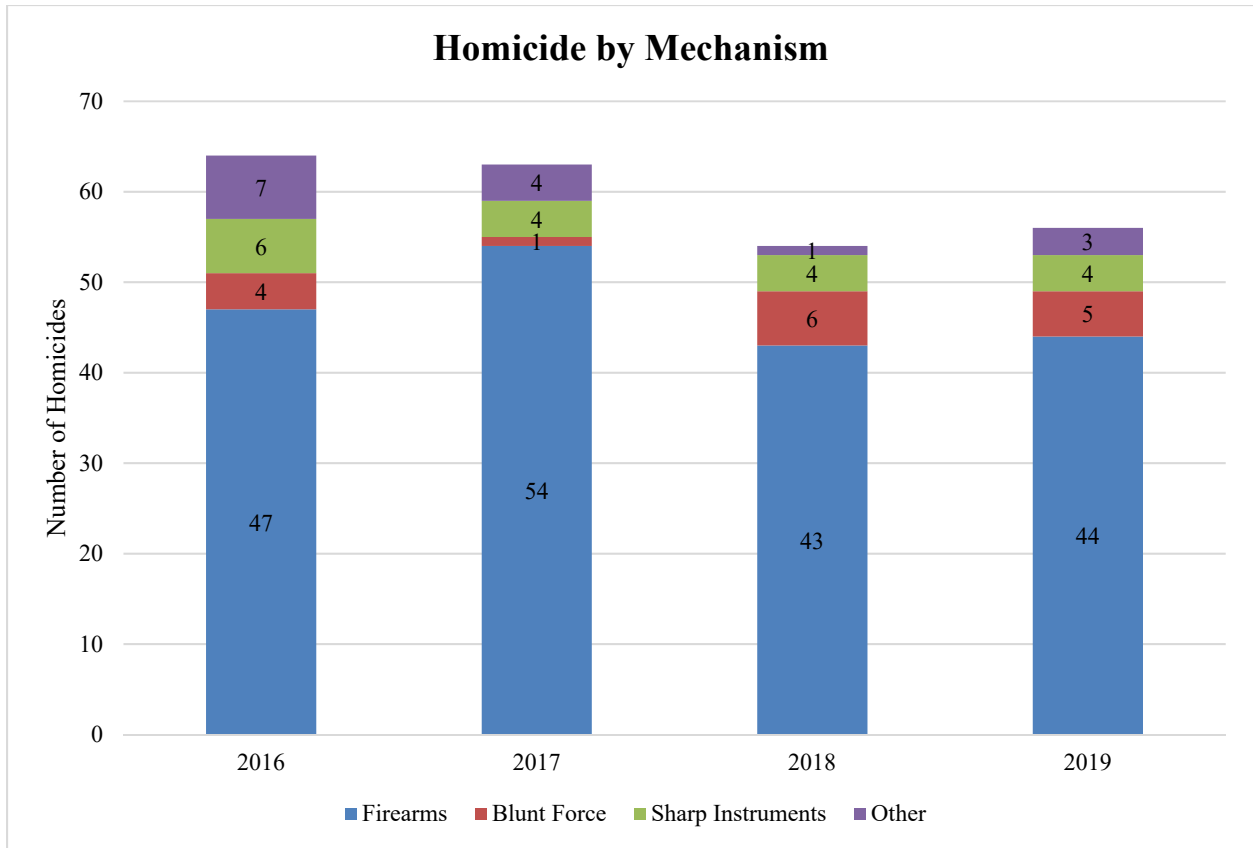
Cases Reviewed

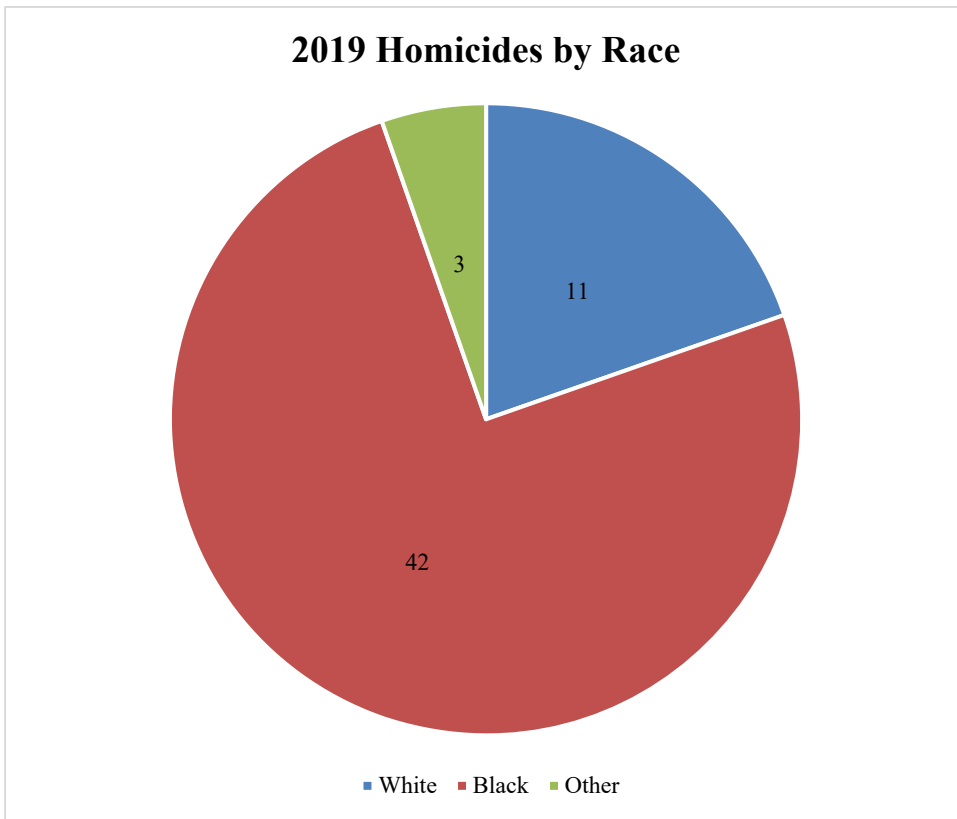
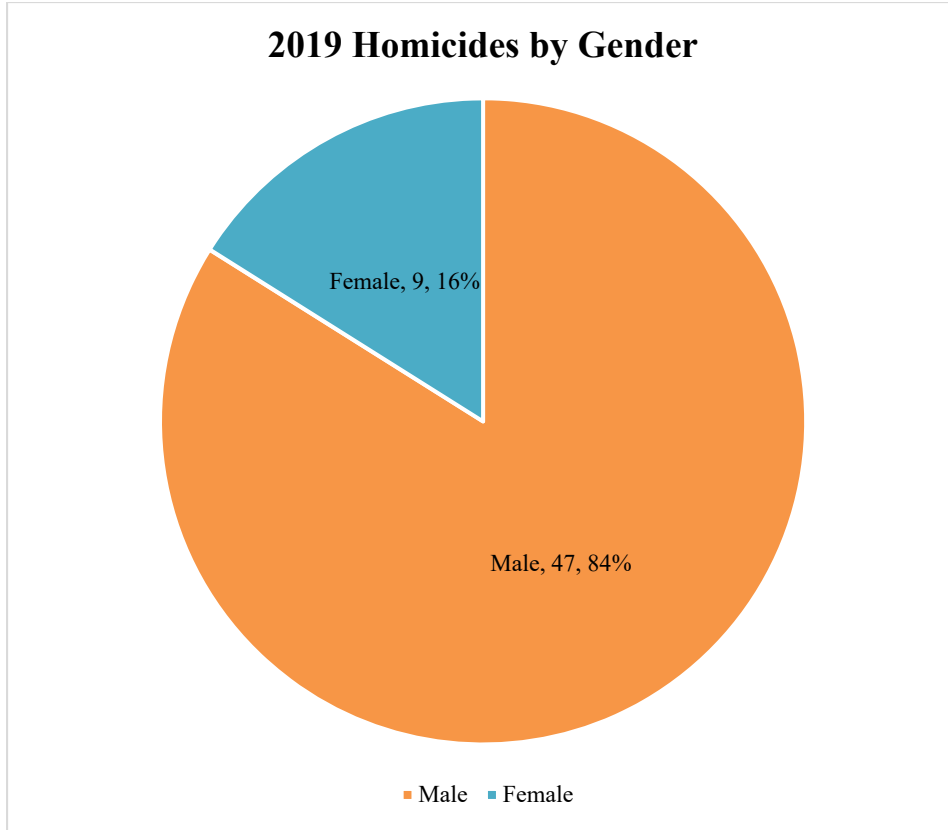




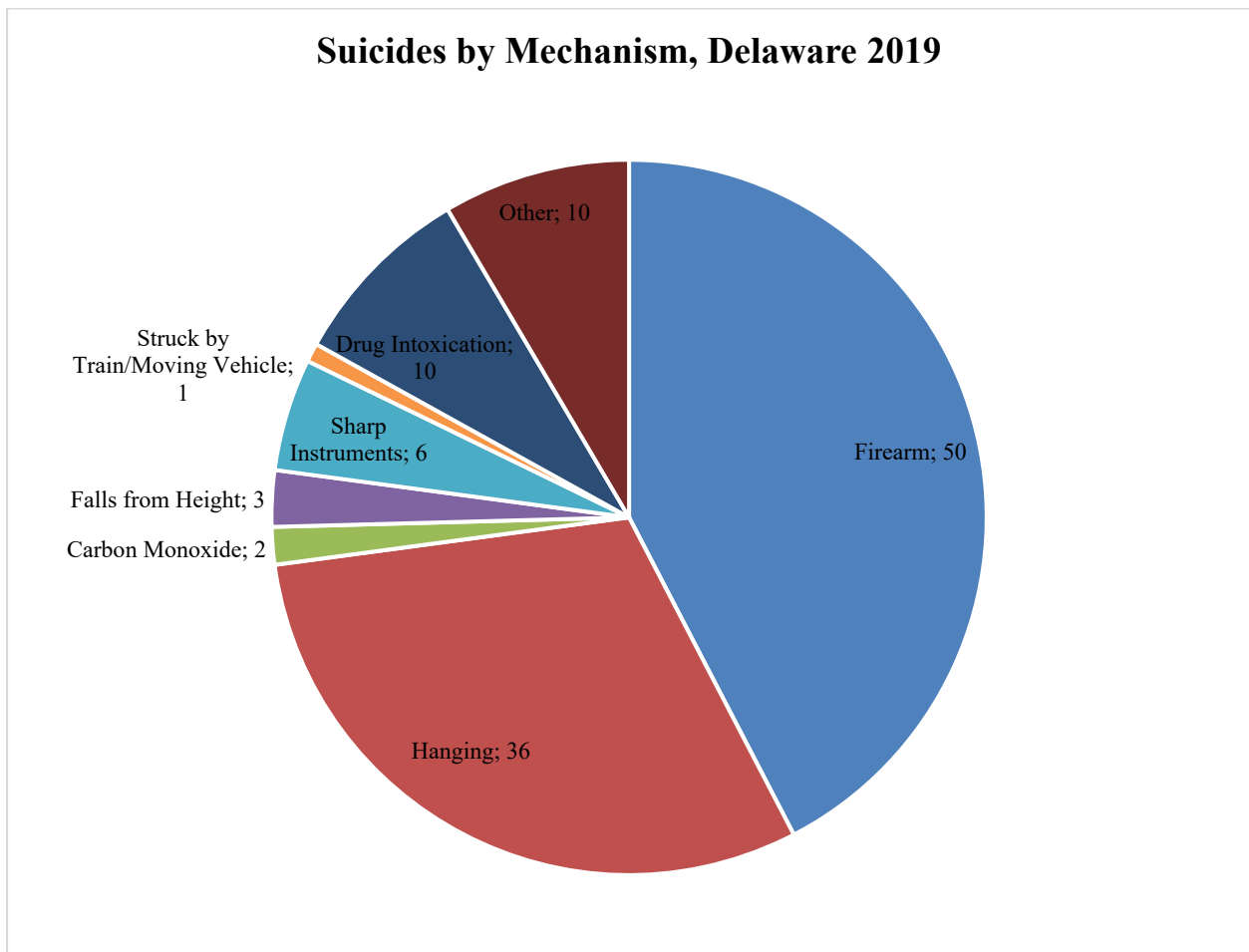
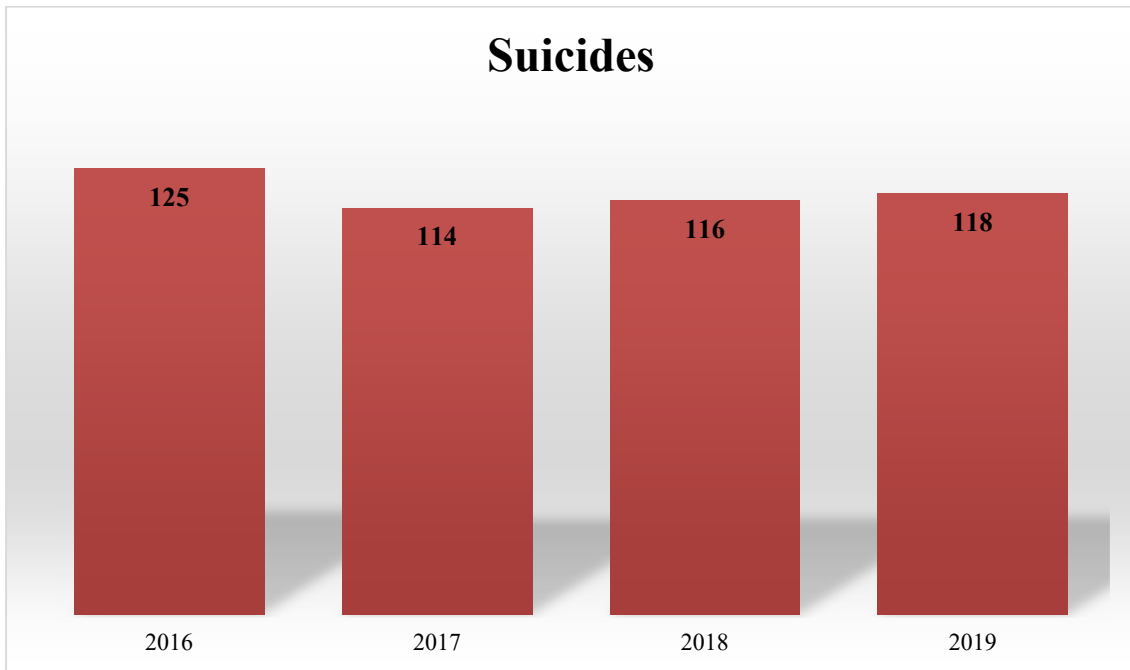
Homicides



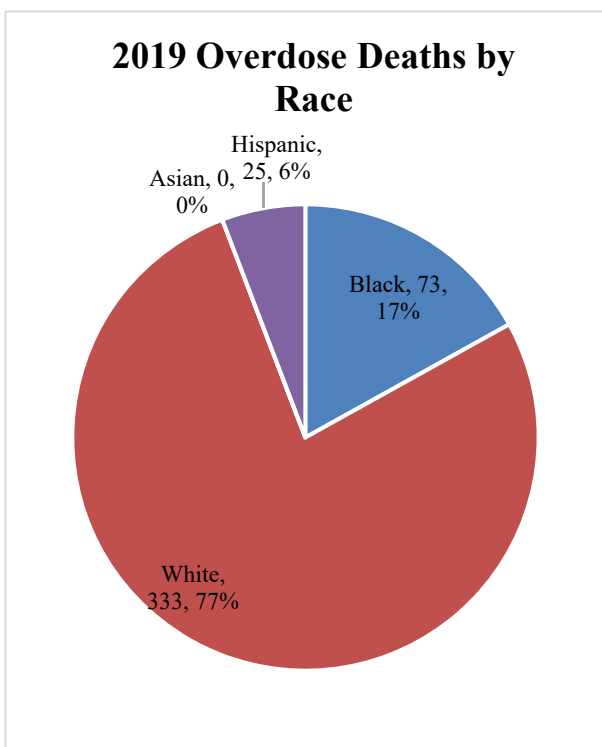
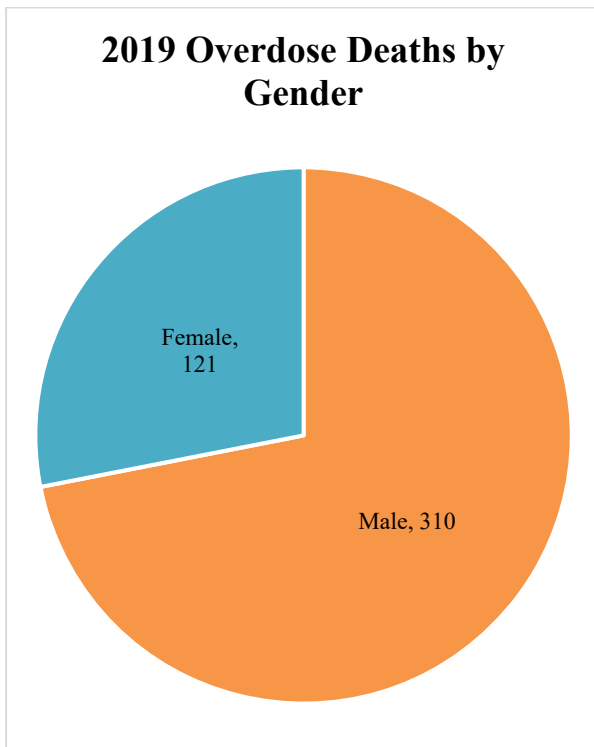
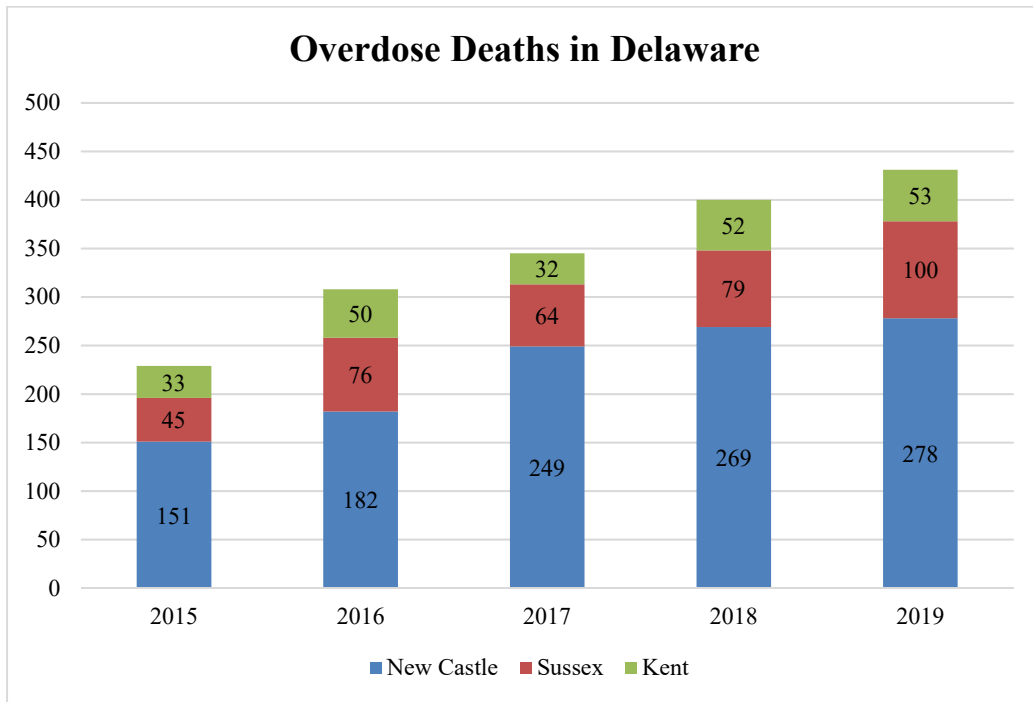


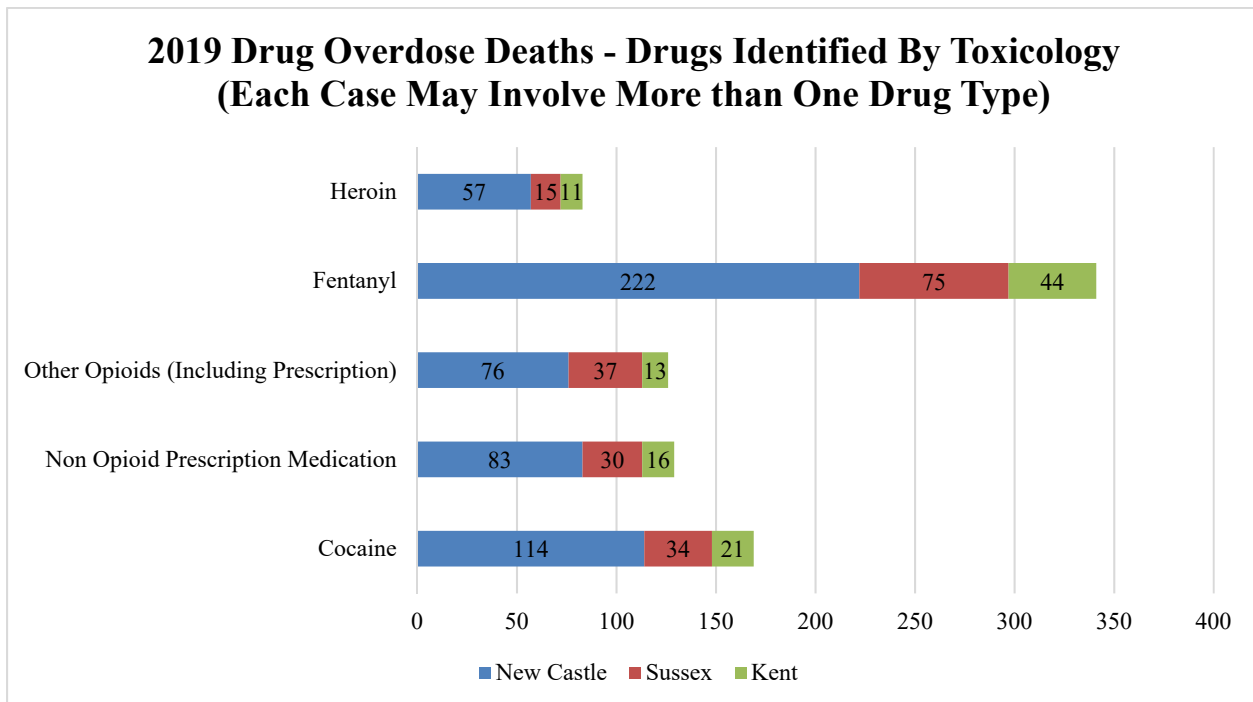
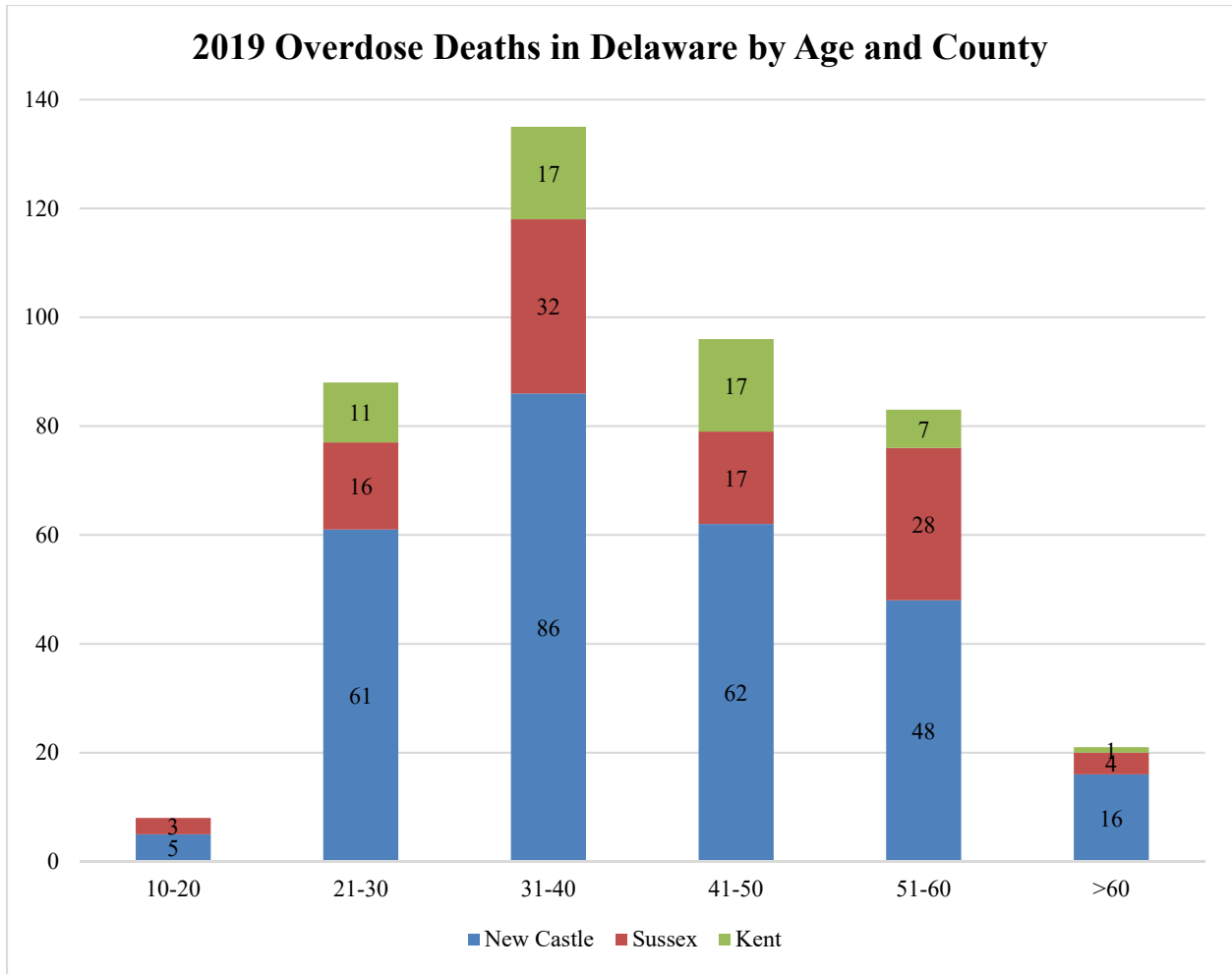


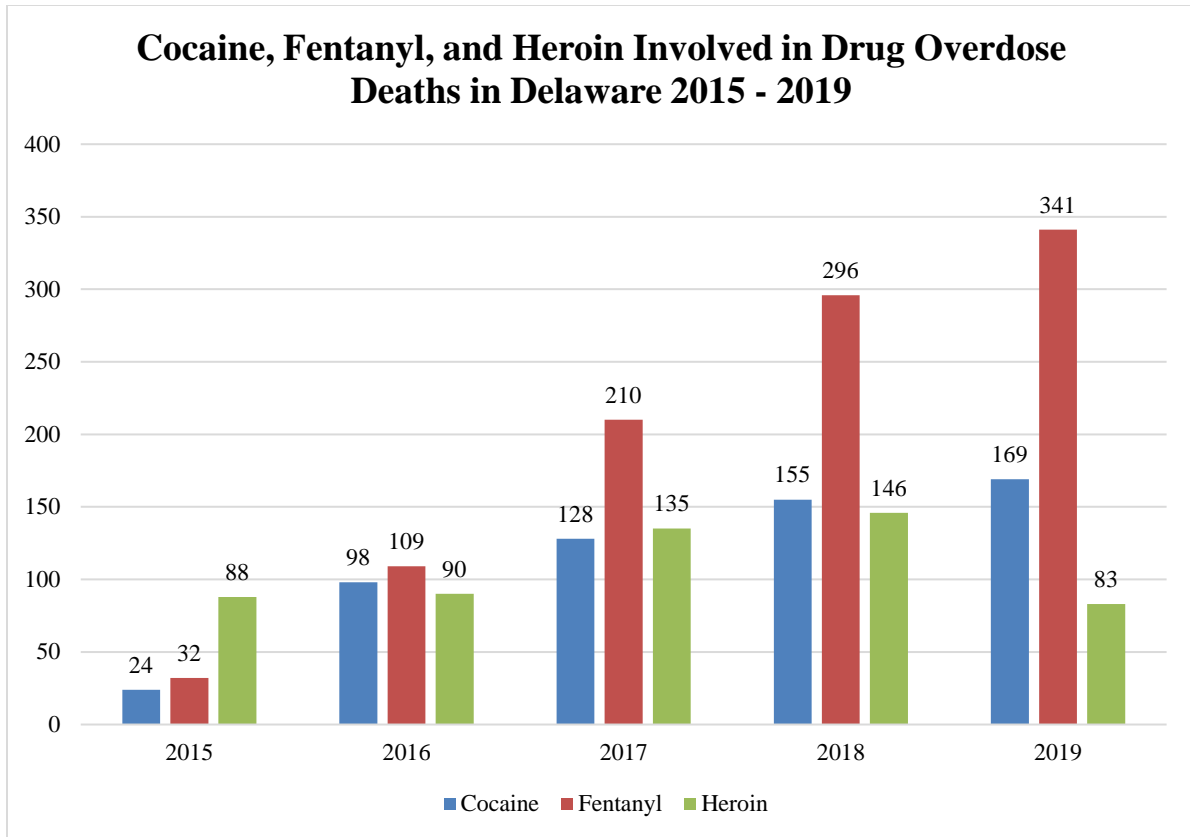
Suicides



Drug Overdose Deaths







Toxicology

Overview

The Toxicology (Tox) Unit of the State of Delaware Division of Forensic Science handles both postmortem and Driving Under the Influence (DUI)/Other cases. The unit is comprised of a staff of ten: the Chief Forensic Toxicologist, the Laboratory Supervisor, seven Analytical Chemists (five for casework and two for research), and one Laboratory Technician. Most cases (including all DUIs) begin with a preliminary ELISA (Enzyme-linked Immunosorbent Assay) Drug Screen, which tests qualitatively for the following 18 drugs/drug classes: Amphetamine, Methamphetamine, Opiates, Phencyclidine, Buprenorphine, Methadone, Benzodiazepines, Cocaine, Barbiturates, Cannabinoids, Oxycodone, Fentanyl, Carisoprodol, Diphenhydramine, Ketamine, Meperidine, Tramadol, and Zolpidem. Positives from this screen are entered for additional confirmatory testing. A Special Testing ELISA panel is also available, which includes Acetaminophen and Salicylates.

The Toxicology Unit has 12 confirmatory procedures for the following drug classes/drugs (and their metabolites), which provide quantitation (concentrations or amounts of drugs): Amphetamine-type Stimulants and Bupropion (AMP)², Antidepressant (ADP), Cannabinoid, Cocaine, Fentanyl, Methadone, Opioid, Phencyclidine, and Alkaline Drugs (Benzodiazepines, Cyclobenzaprine, Diphenhydramine, and Tramadol). All confirmatory procedures utilize Gas Chromatography-Mass Spectrometry (GC-MS) except the AMP and ADP methods, which use Liquid Chromatography-MS/MS (LC-MS/MS).

In addition to the ELISA Drug Screen, the Toxicology Unit has two confirmatory (but qualitative) drug screens. The Alkaline Drug Screen (ALKDS) procedure covers approximately 200 different compounds, and the Acidic/Neutral Drug Screen (ANDS) covers another approximately 20 compounds.

Alcohol/Volatiles Analysis using Headspace Gas Chromatography with Flame Ionization Detection (GC-FID) is another routine procedure used by the unit. In addition to ethanol, this procedure provides quantitation of acetone, isopropanol, and methanol and qualitative identification of acetaldehyde and 1,1-difluoroethane.

Staffing and Accreditation

The Toxicology Unit expanded its staff by two positions in 2019, going from a total of eight positions to now ten, by acquiring two budget positions from our office's Forensic Chemistry Unit (FCU). Filling those positions, two additional casework chemists joined the unit in April, both of whom had previous

² Note that the validation of this method and its implementation for casework were completed in August 2019, as will be detailed later.

experience in toxicology laboratories. In February, the most senior Analytical Chemist III chose to vacate her full-time casework position and instead serve the unit in a newly designated part-time research capacity. Filling the vacancy, an Analytical Chemist III from the FCU with prior experience in toxicology voluntarily transferred to the Toxicology Unit. When the unit’s part-time Laboratory Technician transferred to the Medical Examiner Unit, it was determined that, with the addition of the casework chemists, the part-time Laboratory Technician position could be left unfilled and was eventually transferred to the FCU. The Tox Unit took on one intern from the University of Delaware (UD) for five weeks, beginning in early January; she worked on a project, which will be discussed later.

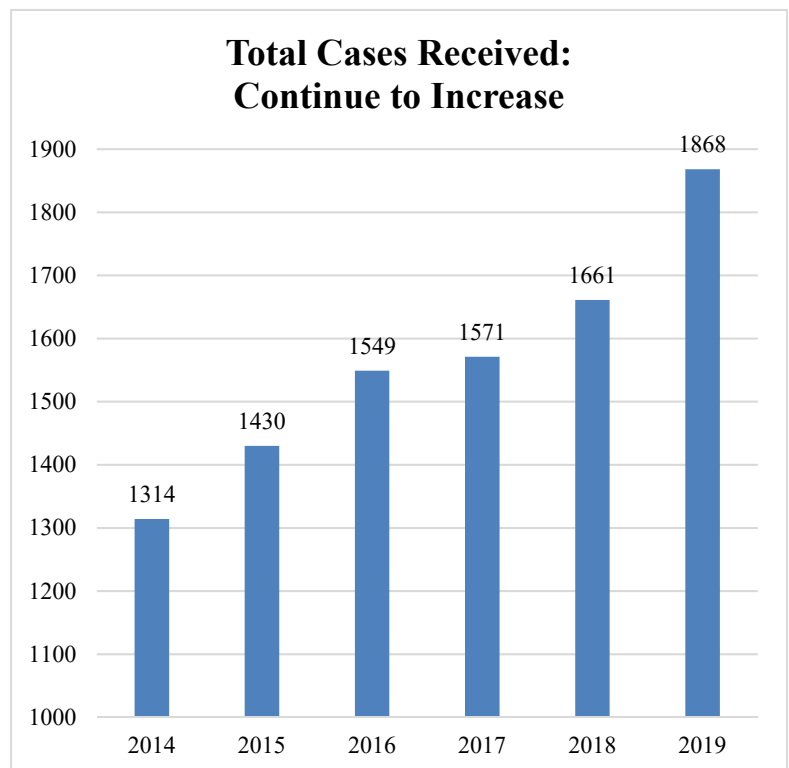
The Tox Unit is a dually accredited laboratory—both to the standards set by ISO/IEC 17025:2017 and by the American Board of Forensic Toxicology (ABFT). The unit had a mid-cycle review with ABFT in May 2019. The unit maintained the laboratory accreditation requirements for which it was previously granted a Certificate of Laboratory Accreditation in Forensic Toxicology for the period July 1, 2018 to June 30, 2020.

Data

The below statistics have been hand-gathered and hand-tallied.

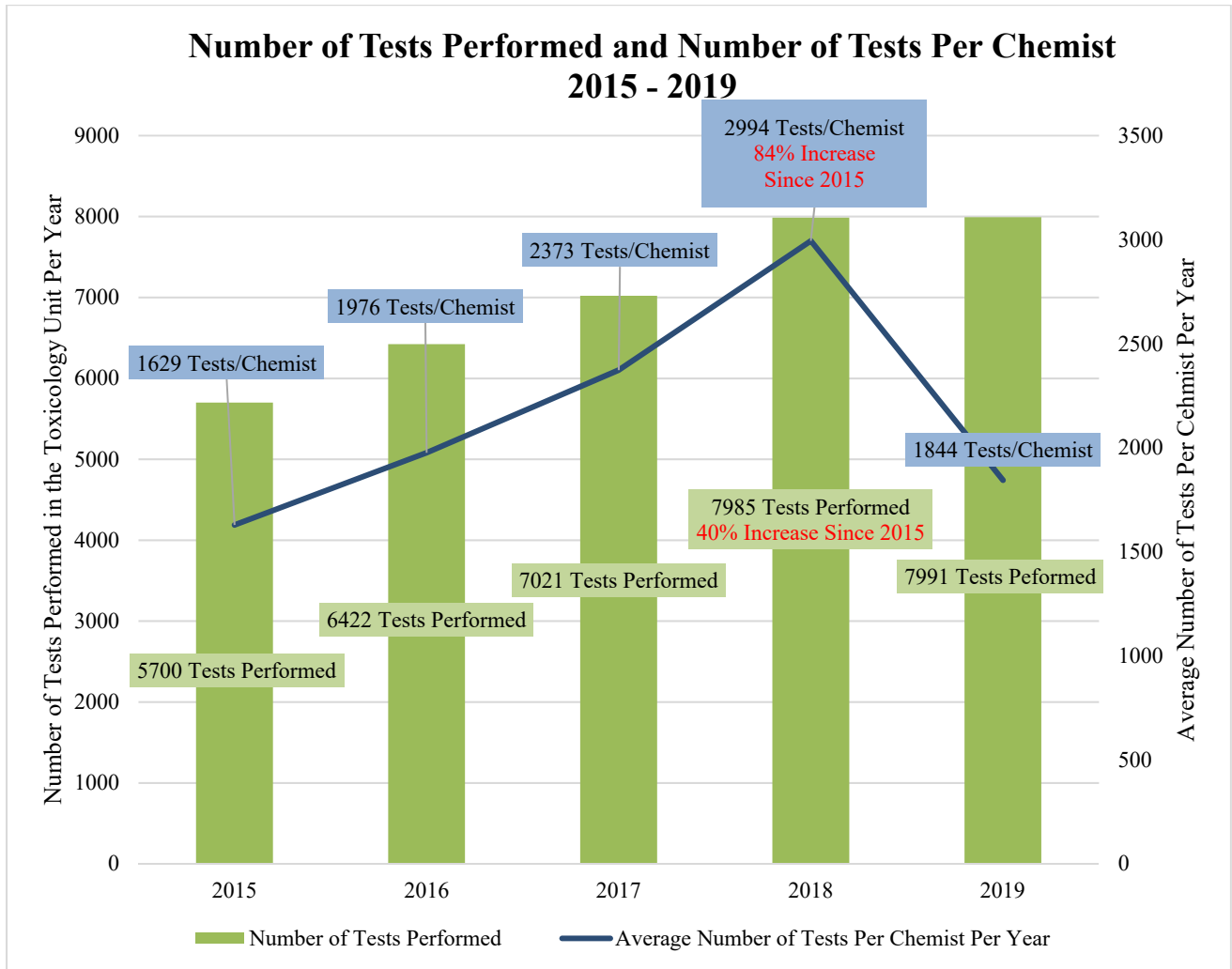
Total Cases Received, Total Tests Performed, and Average Number of Tests Per Chemist Per Year

In 2019, the Toxicology Unit received **860 DUI/Other cases** and **1008 postmortem cases**³ for testing. This equated to a total of **1868 total cases received** and **7991 total tests run in 2019**. Due to gained efficiencies (such as canceling secondary samples for fentanyl confirmations), the total number of tests performed remained nearly constant since 2018 when 7985 tests were run. This bar graph shows how the number of cases received has steadily increased since 2014—**up 42% over the last six years**.



³ Note that this total does not include an additional 75 cases that were received by the Tox Unit as “Save Only” cases and for which no testing was completed.

Because each case may have multiple samples and/or require more than one test, and because the unit also runs 40+ proficiency test samples each year (as well as verifications and sometimes repeat samples), the number of tests performed far exceeds the number of cases received each year. For example, in 2019, there were 7991 tests performed in the Tox Unit—a **40% increase since 2015** (when 5700 tests were performed). Taking actual staffing levels into consideration, the average number of tests per chemist rose 84% from 2015 to 2018 (2994 tests/chemist in 2018 versus 1629 in 2015). The following graph illustrates the number of tests performed and number of tests per chemist over the last five years.

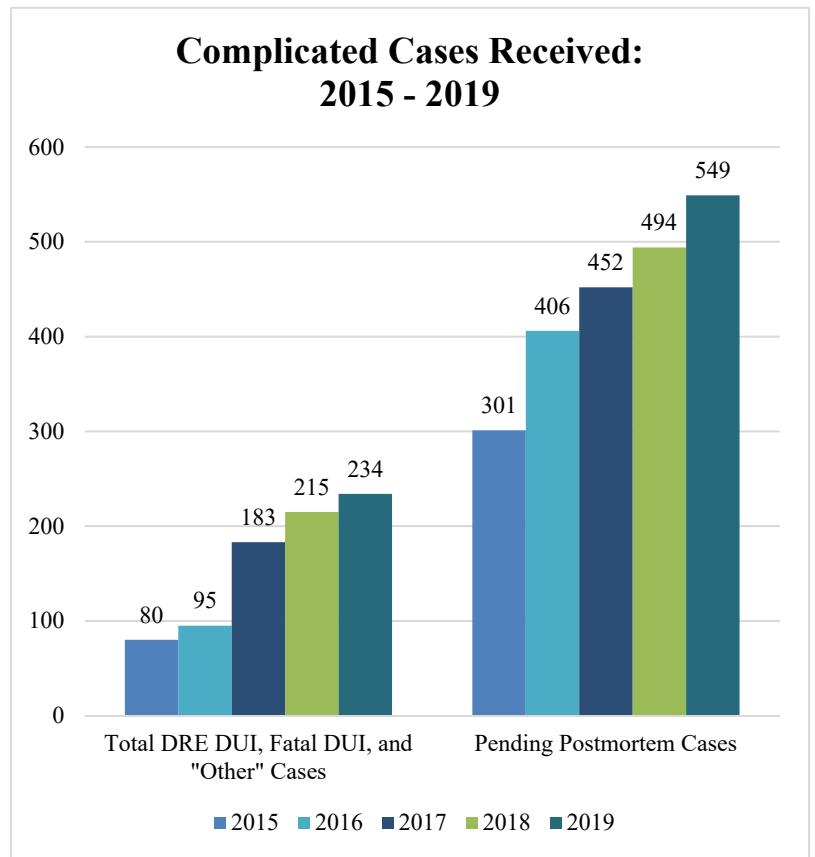


This graph illustrates that receiving the two additional casework chemist positions effectively brought the number of tests per chemist back down to a manageable level (to 1844 tests/chemist in 2019). Despite increases in caseloads for both case types in 2019, the Tox Unit managed to keep turnaround times at acceptable levels.

Increase in Complicated Cases

DUI DRE, Fatal, and Other Cases

To really get a handle on the amount of work being done in the unit, one needs to examine the number and type of tests that are being completed. DUI cases received from Drug Recognition Experts (DREs), for example, generally require significantly more testing than non-DRE cases. The same is true for fatal and “Other” cases such as inquiries into child death or endangerment (including children who have died while caregivers were drug-impaired and children consuming drugs themselves). As the chart shows, the number of DRE, Fatal, and Other cases are rising precipitously, **up 193% since 2015**.



Pending Postmortem Cases

Similarly, different types of postmortem cases require varying amounts of time to complete. Pending cases, so named because the cause and/or manner of death is/are pending further investigation (and which include suspected drug deaths), comprised 54% of the postmortem cases received. These pending cases often require multiple tests, including time-consuming ALKDS procedures and/or advanced quantitative confirmations. The number of postmortem pending cases is **up 82% since 2015**. The Tox Unit often receives hospital samples from drug overdose deaths for complete testing.

ELISA Drug Screening Data

The below tables display the ELISA Drug Screen results to show the number of positives for each drug/drug class for all cases as percentages of the total cases received. It is important to note that this is screening data, so these are strictly preliminary results.

Fentanyl remains the drug on ELISA with the greatest percentage of postmortem cases screening positive (37.8%), as can be seen in the below table; this percentage grew another 2% since 2018 when the

percentage was 35.8%. The next highest percentages, which were all greater than 20%, were as follows: cannabinoids, None Detected, opiates, and cocaine.

Postmortem Cases:

Drug/Drug Class (Cross-Reactives) on ELISA	Percentage of Postmortem Cases that Screened Positive			
	2019	2018	2017	2016
Fentanyl	37.8%	35.8%	27.8%	14.7%
Cannabinoids	26.0%	25.9%	28.0%	24.3%
None Detected	25.6%	24.6%	29.5%	34.5%
Opiate	25.0%	27.9%	20.6%	18.4%
Cocaine	21.0%	21.5%	20.8%	17.7%
Diphenhydramine	16.5%	14.5%	N/A	N/A
Benzodiazepine	13.1%	14.0%	10.9%	13.6%
Amphetamine	11.6%	10.4%	8.6%	9.8%
Oxycodone	9.0%	8.5%	9.5%	11.3%
Methamphetamine	5.1%	3.4%	1.9%	1.6%
Buprenorphine	4.4%	2.4%	N/A	N/A
Methadone	4.0%	4.8%	4.1%	4.3%
Tramadol	2.7%	1.6%	N/A	N/A
Zolpidem	1.5%	0.8%	N/A	N/A
Ketamine	0.8%	0.8%	N/A	N/A
Phencyclidine	0.8%	1.4%	1.2%	0.5%
Barbiturate	0.6%	0.8%	1.6%	1.2%
Carisoprodol	0.4%	0.3%	0.5%	0.7%
Meperidine	0.0%	0.0%	N/A	N/A

Of the DUI/Other cases received in 2019, 57.1% screened positive for cannabinoids (marijuana). Fentanyl, benzodiazepines, and opiates are now the next top three categories; in 2018, they were fentanyl, opiates, and cocaine, and in 2017, they were cocaine, fentanyl, and opiates. This again shows that more than one-third of our DUI/Other population is screening positive for fentanyl, and this percentage grew approximately 5% in just one year (from 32.8% in 2018 to 37.7% in 2019).

DUI/Other Cases:

Drug/Drug Class (Cross-Reactives) on ELISA	Percentage of DUI/Other Cases that Screened Positive			
	2019	2018	2017	2016
Cannabinoids	57.1%	49.3%	53.1%	55.2%
Fentanyl	37.7%	32.8%	22.7%	12.9%
Benzodiazepine	24.7%	21.1%	20.9%	22.9%
Opiate	24.1%	24.8%	21.7%	20.6%
Cocaine	20.8%	24.4%	25.3%	21.5%
Methadone	11.9%	7.8%	8.2%	6.1%
Methamphetamine	9.7%	4.2%	3.8%	3.9%
Oxycodone	8.8%	7.8%	9.7%	13.2%
Amphetamine	8.4%	5.6%	4.3%	4.6%
Diphenhydramine	7.2%	6.6%	N/A	N/A
None Detected	5.6%	7.7%	9.1%	7.7%
Phencyclidine	4.9%	7.8%	6.4%	6.5%
Buprenorphine	4.4%	4.5%	N/A	N/A
Zolpidem	1.5%	1.5%	N/A	N/A
Barbiturate	0.8%	1.3%	0.7%	1.0%
Carisoprodol	0.8%	0.4%	1.1%	2.8%
Tramadol	0.7%	0.6%	N/A	N/A
Ketamine	0.6%	0.3%	N/A	N/A
Meperidine	0.0%	0.0%	N/A	N/A

Top Ten Reported Compounds from Confirmatory Procedures

The below tables show confirmatory results. For postmortem cases, fentanyl stayed in the #1 spot as the top reported compound from confirmatory procedures in 2019 (at 37.4% of all postmortem cases received), followed by ethanol (27.1%), which was in the #1 spot in 2017 and 2016, and then benzoylecgonine, which is an inactive metabolite of cocaine.

Postmortem Cases:

Top Ten Order	Confirmatory Method	Compound	As a Percentage of Total Postmortem Cases Received
1	Fentanyl	Fentanyl	37.4%
2	Alcohol/Volatiles	Ethanol	27.1%
3	Cocaine	Benzoyllecgonine	20.2%
4	Cocaine	Ecgonine Methyl Ester	17.8%
5	Cocaine	Cocaine	17.2%
6	Opiates	Morphine	15.2%
7	Opiates	6-Acetylmorphine	9.3%
8	Opiates	Oxycodone	8.2%
9	ALKDS	Fentanyl	5.7%
10	ALKDS	Diphenhydramine	5.5%

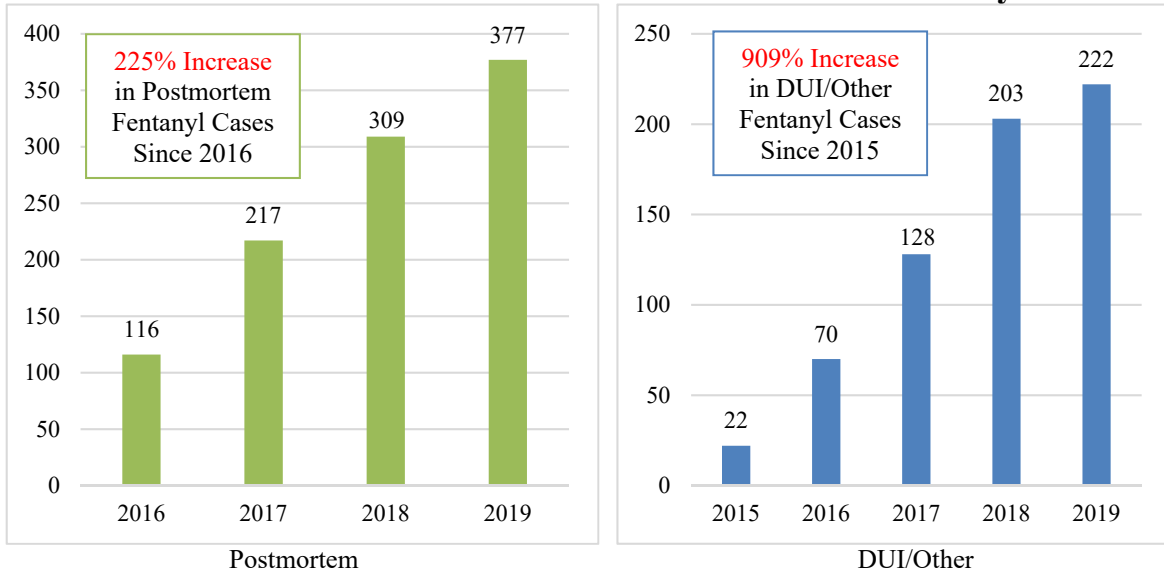
The inactive marijuana metabolite, delta-9-carboxy-tetrahydrocannabinol, was confirmed positive in 43.0% of the DUI/Other cases received, and the active parent compound of marijuana, delta-9-tetrahydrocannabinol (THC), was confirmed positive in 30.9% of DUI/Other casework. Fentanyl was the third top reported compound for DUI/Other cases at 25.8%, and benzoyllecgonine (an inactive metabolite of cocaine) was fourth (17.8%).

DUI/Other Cases:

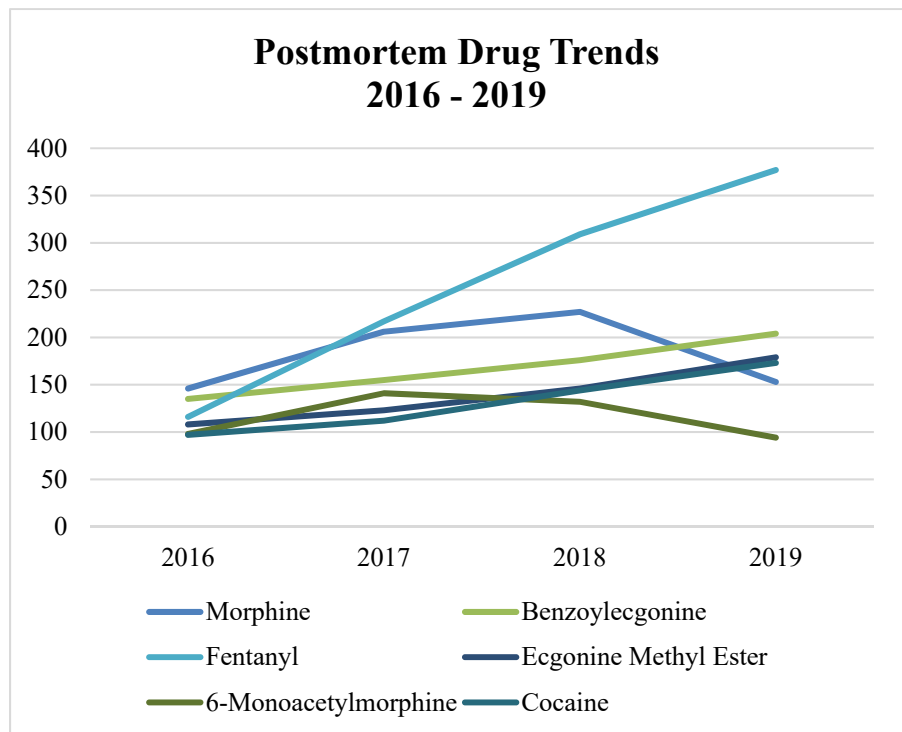
Top Ten Order	Confirmatory Method	Compound	As a Percentage of Total DUI/Other Cases Received
1	Cannabinoids	Delta-9-Carboxy-Tetrahydrocannabinol	43.0%
2	Cannabinoids	Delta-9-Tetrahydrocannabinol	30.9%
3	Fentanyl	Fentanyl	25.8%
4	Cocaine	Benzoyllecgonine	17.8%
5	Cocaine	Cocaine	10.3%
6	Cocaine	Ecgonine Methyl Ester	9.7%
7	Methadone	Methadone	8.6%
8	Benzos	Alprazolam	7.4%
9	Opiates	Morphine	5.9%
10	Opiates	Oxycodone	5.1%

Fentanyl confirmations in the Tox Unit have increased **225% for postmortem cases since 2016** and **909% for DUI/Other cases since 2015**, as the below charts illustrate. This shows how the opioid/fentanyl epidemic continues to escalate.

Number of Cases that Confirmed Positive for Fentanyl



As the line graph on **Postmortem Drug Trends** demonstrates, while fentanyl confirmations have risen sharply (more so than any other drug), so have the following cocaine compounds from 2016 to 2019: cocaine (up 78.4%), ecgonine methyl ester (up 65.7%), and benzoylecgonine (up 51.1%). Interestingly, confirmations of the following opioid compounds have decreased from 2018 to 2019: morphine (down 32.6%) and 6-monoacetylmorphine, which is a metabolite indicative of heroin (down 28.8%).



Projects and Grants

The Toxicology Unit completed two major projects in 2019. In April, our *Alcohol/Volatiles Analysis by Headspace GC-FID* validation project was finalized; this project began in July 2018, and two UD interns contributed to this project. With this validation, we lowered our lower limit of quantitation (LLOQ) down to 0.010 g/dL for ethanol and the other volatiles. This was a recommendation from our May 2018 ABFT inspection. This method is applicable to whole blood, serum/plasma, subdural/epidural clots, vitreous humor, urine, and brain.

The second project, which concluded in August, was our *Amphetamine-type Stimulants and Bupropion Confirmation and Quantitation by LC-MS/MS* validation. With this method, we can now quantitate 12 more drugs and detect seven more drugs qualitatively, as shown below:

Quantitative Analytes

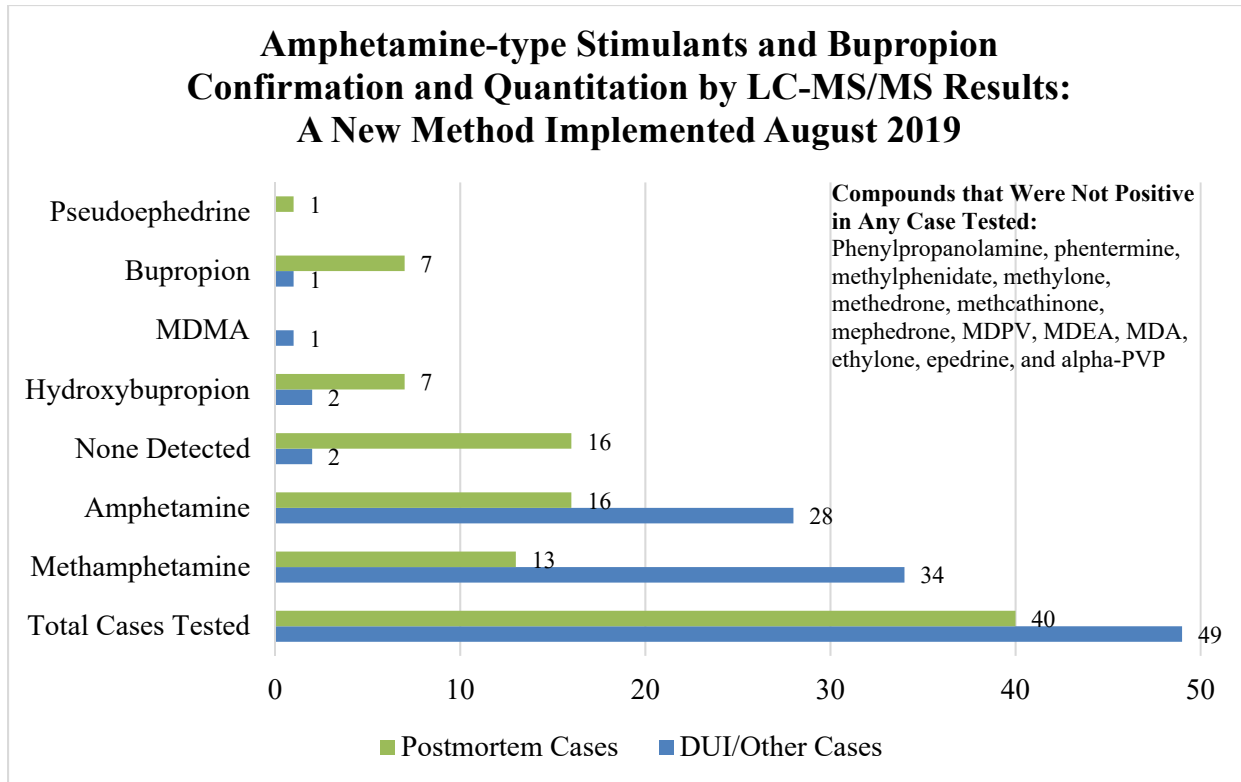
1. Amphetamine
2. Methamphetamine
3. MDA
4. MDMA
5. Phentermine
6. Pseudoephedrine
7. Bupropion
8. Hydroxybupropion
9. Ephedrine
10. MDEA
11. Phenylpropanolamine
12. Methylphenidate

Qualitative Analytes

1. Methcathinone
2. Methylone
3. Methedrone
4. Ethylone
5. Mephedrone
6. MDPV
7. Alpha-PVP

This method comprises 33 total analytes when including the 14 internal standards, and the reporting range is 20-2000 ng/mL for all 19 analytes listed above. A lot of time and effort went into this project, from the design and development, to the validation runs, and all the way through to the data review. The Chief Forensic Toxicologist would like to recognize all members of the Tox team and the Quality Assurance Manager for their contributions to both completed projects.

Below is a chart that shows the analytes that were detected and reported with this new AMP panel during the last third of 2019 (August-December). Amphetamine and methamphetamine were detected the most often. Sixty-nine percent of the tested DUI/Other cases had methamphetamine confirmed and 57% had amphetamine.



The Tox Unit received additional federal grant funds in 2019 to support their efforts in expanding testing in response to the opioid/fentanyl epidemic. With these funds, the unit purchased a new Agilent 1290/6470 LC-MS/MS and an uninterruptable power supply (UPS), which were installed late May/early June. Additionally, the unit hired a consulting company to come on site in mid-June to validate an expanded fentanyl, fentanyl analog, and synthetic opioid panel on this new instrument in both blood and urine (the existing method on GC-MS covered only fentanyl). Lastly, the Tox Unit made great progress with their expanded benzodiazepine panel (again, to include more analytes and move it from GC-MS to this new LC-MS/MS). Training for staff on the fentanyl method and troubleshooting of it and the instrument delayed the implementation of this method in 2019, but it will be live for all 2020 casework, along with the expanded benzodiazepine panel.

The Tox Unit also received federal grant funds through the Centers for Disease Control and Prevention’s (CDC’s) Overdose Data to Action (OD2A) cooperative agreement. The following items were purchased in 2019 through this grant: four more benchtop hoods, 12 new electronic pipettes and three charging stands, and new Biotage equipment (SPE Dry 96 Sample Concentrator and Pressure+ 96 Positive Pressure Manifold). These supplies are necessary to continue meeting our mission and to expand our testing capabilities, especially those pertaining to the opioid/fentanyl epidemic.

DNA

Overview

The DNA laboratory consists of two sections, the Databasing or CODIS (COmbined DNA Index System) section and the Casework section. The Databasing section processes all the convicted offender samples submitted to the laboratory from the Delaware State Police/State Bureau of Identification (DSP/SBI), Probation and Parole, and the Department of Corrections (DOC), then uploads the generated DNA profiles into the CODIS database. The Casework section examines evidence, conducts preliminary testing for body fluids, performs DNA testing, and interprets data derived from the tests to draw and support conclusions. The laboratory accepts all cases ranging from theft and property crimes to homicides and sexual assaults. The DNA profiles generated from processing casework may also be entered into the State and National databases.

CODIS

At the beginning of 2019, 26 offender samples had not been uploaded to CODIS. All of these samples were received by the laboratory in December of 2018. During 2019, the CODIS section received an additional 1401 offender samples. This number includes samples that could not be tested due to incomplete submission information. The laboratory received approximately 16% more samples in 2019 than in 2018 (received 1209).

The average turnaround time (TAT) for uploading offender samples into the National database decreased about 40% from an average of 25 total days (18 working days) in 2018 to an average of 15 total days (11 working days) in 2019. We continue to work with DOC when samples do not produce a usable profile.

In 2019, 1198 offender samples and 181 casework samples were uploaded into the State and National databases. Offender samples were processed on a monthly basis, and by the end of the year all of the samples received prior to December 2019 had been uploaded except one. The 119 remaining samples from 2019 are on schedule to be processed during the first quarter of 2020. In 2019, the DNA laboratory had 68 CODIS hits or “matches” from either the State or National database, including 8 cases from New Jersey, Maryland, West Virginia, Florida, and California that hit to DE convicted offenders. These cases include burglary, sexual assault, and armed robbery.

Delaware has received Sexual Assault Kit Initiative (SAKI) Grant funds for testing sexual assault kits that were collected prior to April 30, 2015. These kits are being tested by a private laboratory; however, any kit that results in a DNA profile foreign to the victim is reviewed by DFS for upload into CODIS. We began receiving profiles from the private laboratory in May 2017. In 2019, we uploaded 59 unknown

profiles into CODIS from SAKI cases. Those profiles have resulted in 16 hits in the state database and 4 hits in the national database.

The table below reflects the types of cases that have hit in CODIS for 2019.

CODIS Hits	Type of Case	CODIS Hits	Type of Case
2	Assault	1	ID
16	Burglary	3	Robbery
1	Homicides	37	Sexual Assaults
2	Home Invasion	3	Theft
1	Carjacking	1	Indecent exposure
1	Possession with intent		

Casework

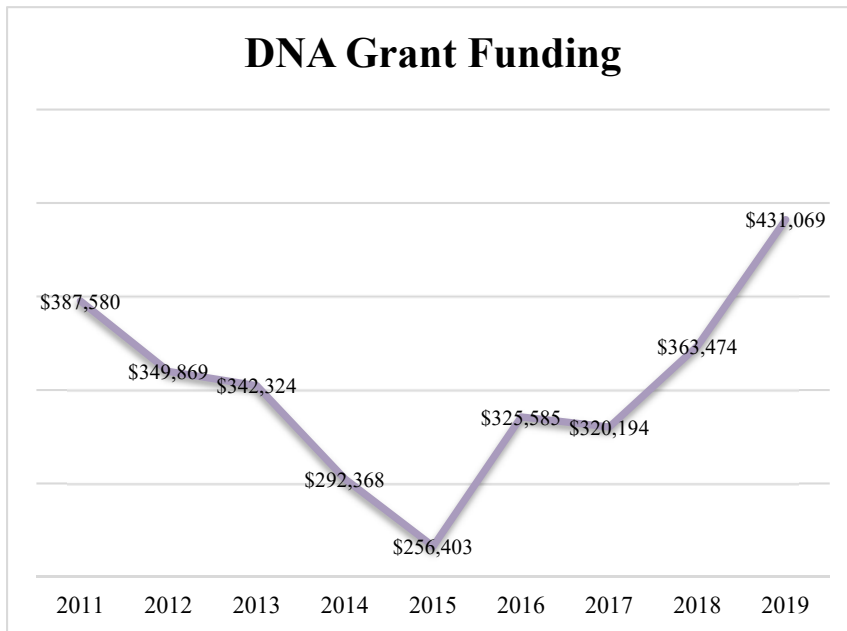
In the beginning of 2019, there were 79 cases that were either assigned but not completed, or unassigned from 2018. Thirty (30) of those cases were unassigned, this included cases with suspects and unknown suspect. In 2019, the DNA unit received 564 new case submissions and 28 subsequent submissions for a total of 592 submissions. Subsequent submissions are defined as those cases requiring additional testing after a report has been issued or those cases where a report was held until additional evidence had been submitted and tested. There was an approximate 5% decrease in the total number of submissions from the previous year. By the end of 2019, there were 50 cases that were either assigned but not completed or unassigned. This is a 37% decrease from the previous year. The number of unassigned cases at the end of 2019 was 4, compared to 30 in 2018. This is an 87% decrease. These numbers are due to the decrease in the number of cases that were submitted. The table provides a breakdown of the types of cases received

Types of Cases Received in 2018	New Submissions	Supplemental Submissions
Homicide / Att. Homicide	43	13
Sexual Assault	227	11
Assault	23	2
Burglary	47	7
Robbery	38	1
Missing Person	1	0
Death Investigation	2	0
Miscellaneous	58	5
Possession of Firearms	123	3
Proficiency Tests	18	0

during 2019. It should be noted that there was a decrease in the number of sexual assaults and homicide submitted to the DNA laboratory for testing. The decrease in the sexual assault cases submitted to the laboratory was due to outsourcing/SAKI grant received by Delaware.

Our average turnaround time (TAT) also decreased 39% from 57 total days in 2018 to 35 total days in 2019.

The Casework Manager continues to handle the DNA Backlog Reduction Grants. In December, the DNA Backlog Reduction Grant FY2017 ended. The closeout documentation by the laboratory was due to NIJ by January 31, 2020. The laboratory is currently managing the DNA Backlog Reduction Grant for FY



2018, which closes in December 31, 2020. In September, the DNA unit was awarded a DNA Backlog Reduction Grant for FY 2019.

Grant funds have allowed the DNA unit to remain current with advancements and improvements in the field of Forensic DNA testing. In 2019 we received \$431,069.

Grant funding had increased when compared to 2017. This

increase is due to the fact that the DNA Unit uses all the grant funds allotted. In 2019, DFS-DNA laboratory personnel were invited to be a part of the National Institute of Justice (NIJ) and the Scientific Working Group on DNA Analysis Methods (SWGDM) to develop a “Best Practices for DNA Laboratory Efficiency Improvements” publication. This publication is scheduled to be released in 2020.

With the DNA FY2018 and 2019 grant funds, the laboratory continued to purchase reagents and other supplies for processing casework and convicted offender samples, provided required continuing education training for each DNA Analyst, and purchased new laboratory equipment.

With an increase in efficiency, work began on validation projects that were not previously completed. Validation is a critical part of forensic DNA work, and at this time the DNA Laboratory does not have an individual primarily dedicated to performing validation studies. Validations are done by Analysts in the DNA Unit.

A validation that still needs to be completed is for Armed Xpert software. Several studies had already been completed. However, with the upgrade to Windows 10 and GeneMapper ID-X, this validation needed to be restarted to ensure that the data is still accurate. In addition, validation and performance

checks were needed for another analysis software, GeneMapper ID-X, that is used daily by the DNA laboratory. As with all validations, studies must be completed, policies must be in place, and laboratory staff must be trained before using these procedures in casework or databasing. Validation studies and training are also required to maintain laboratory accreditation. During annual audits, validation study documentation is reviewed to determine if a sufficient number of studies have been performed to support the use of the new method/technology in casework/databasing. Training documentation is also reviewed during annual audits.

We continue to use a chemistry kit that examines 27 DNA markers, 7 more than the FBI requirement.

In August 2019, a National DNA Index System (NDIS) Information Security Assessment was conducted by the FBI to ensure our CODIS server was compliant with the Federal law and with procedures governing our participation in CODIS. DFS received notification that our policies were in concordance with the Federal law.

The DNA laboratory underwent external audits for casework and databasing based on the FBI's Quality Assurance Standards in September 2019. DFS received notification from the FBI that the laboratory is in compliance with the FBI Director's Quality Assurance Standards.

All DNA quality control documents have been uploaded to Qualtrax, allowing auditors to easily access all documents.

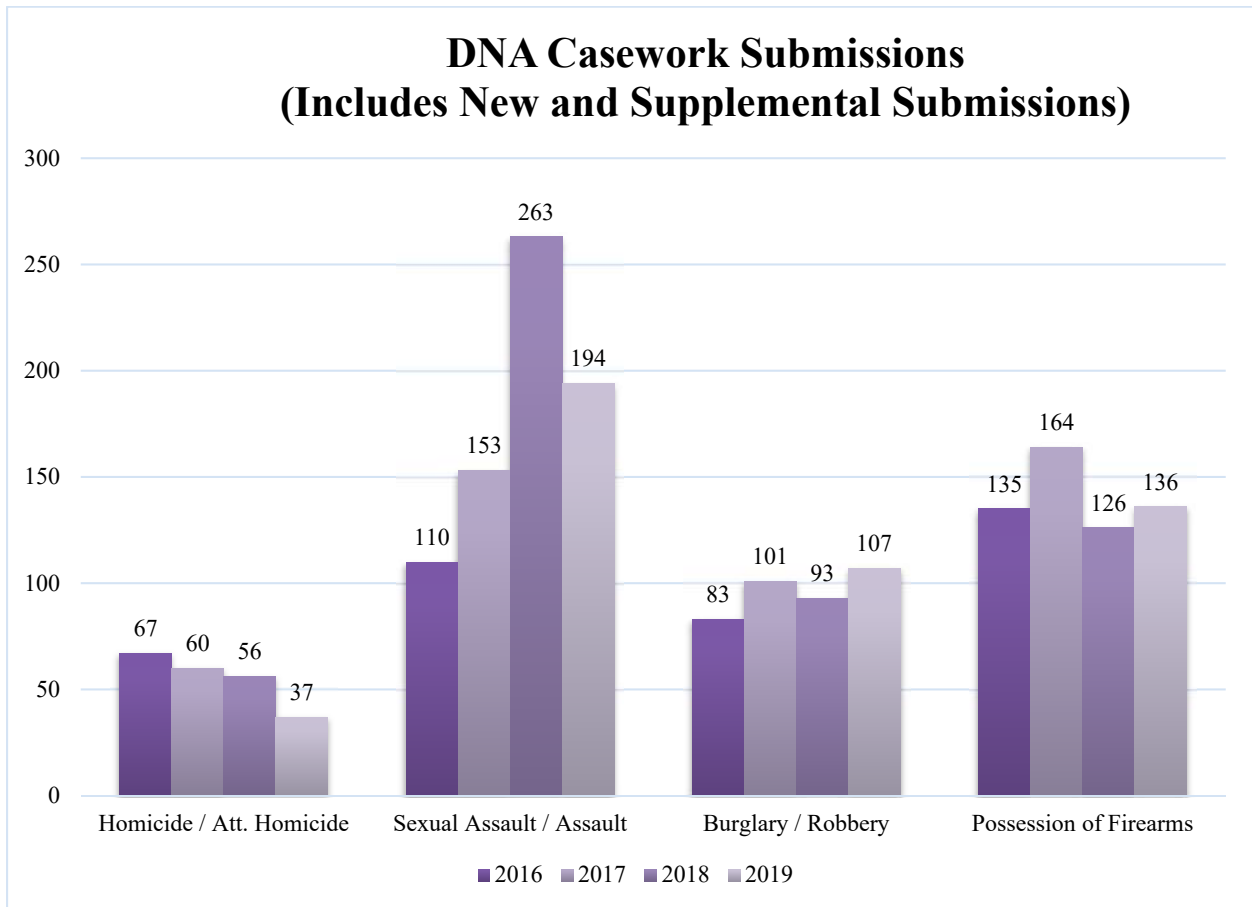
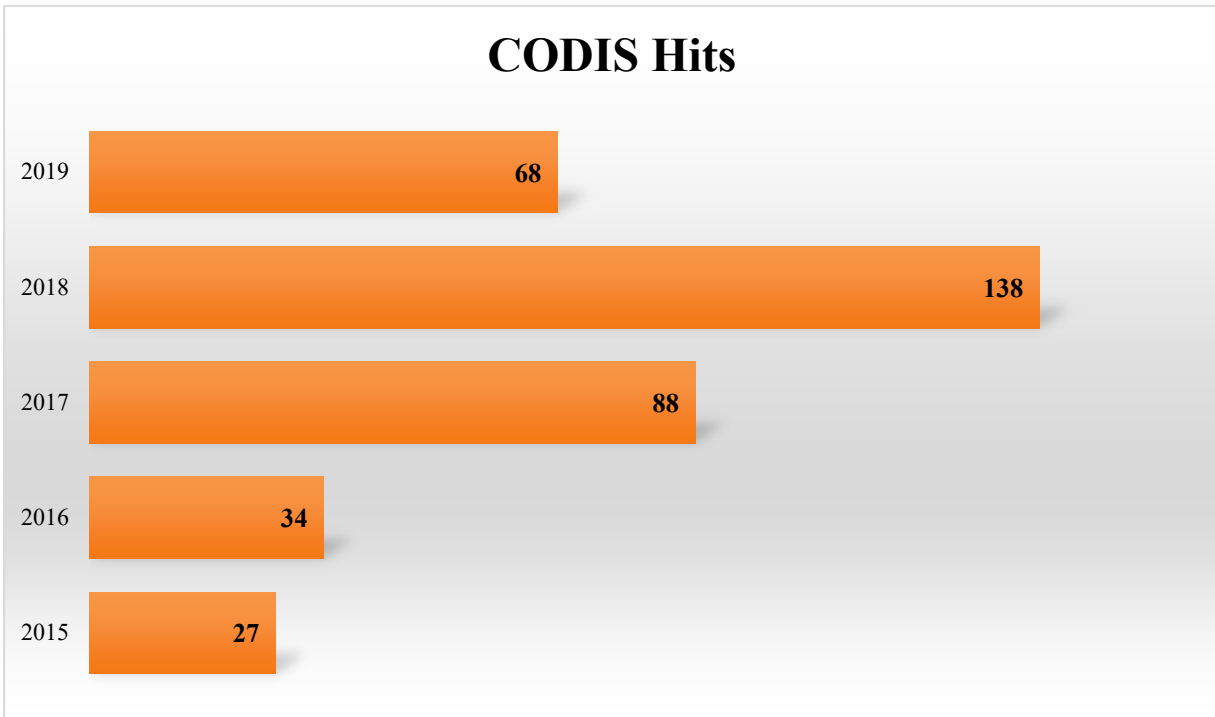
The following chart provides a comparative analysis of casework for 2016, 2017, 2018, and 2019 (the percentages in parenthesis show year-over-year changes):

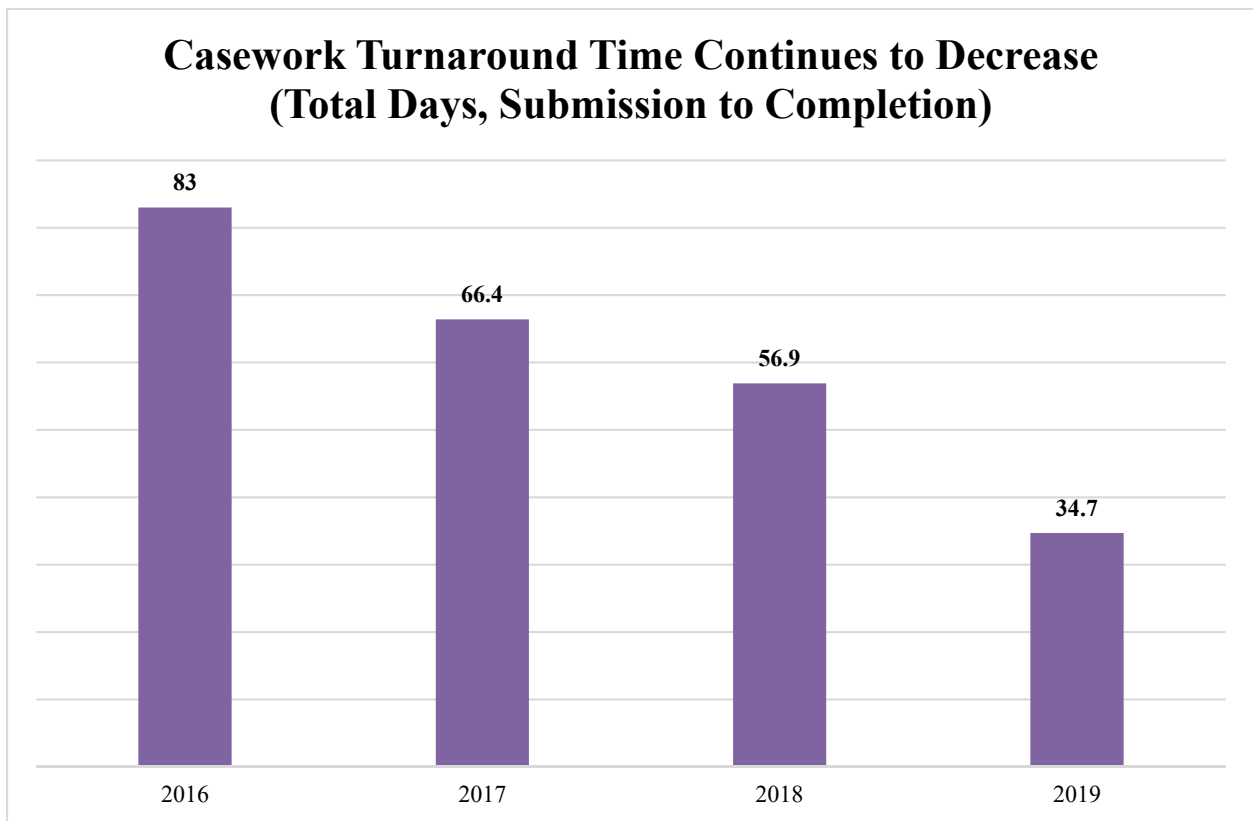
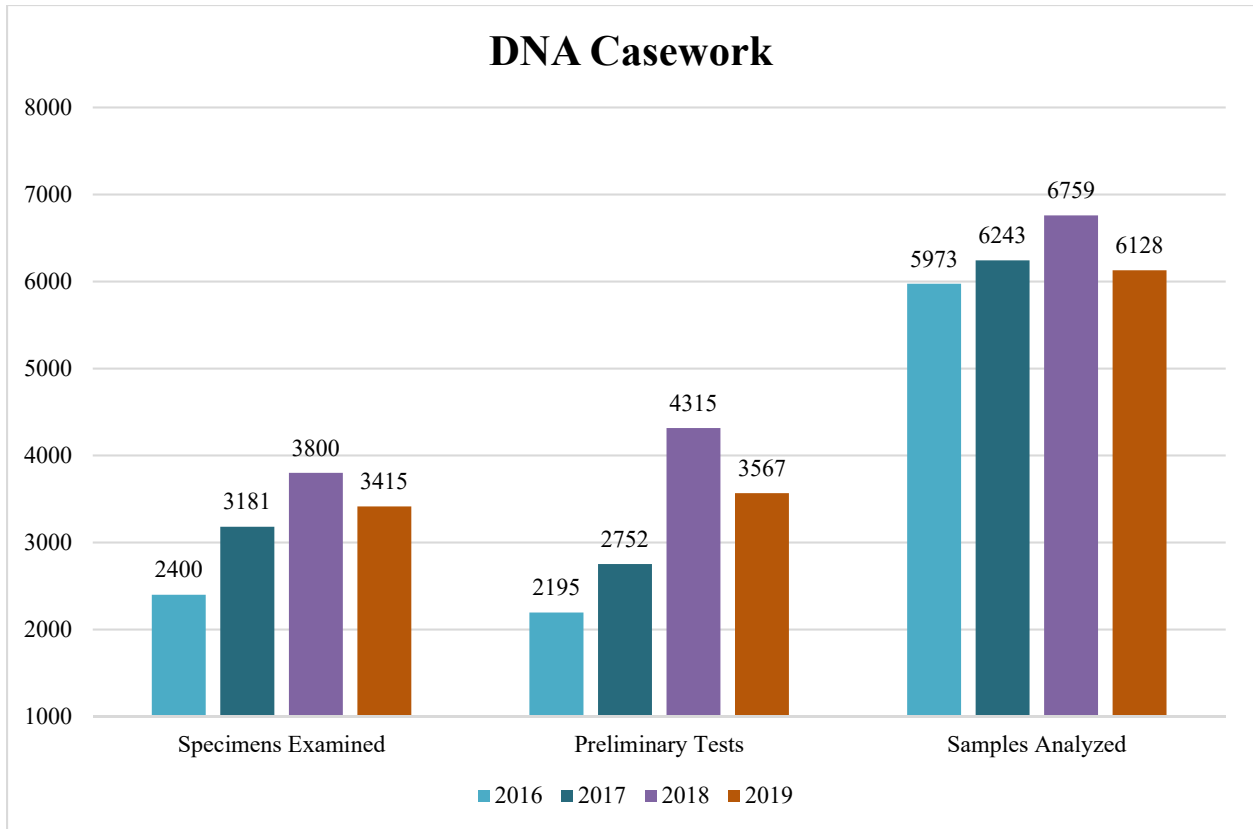
	2016	2017	2018	2019
Total Case completions	475 (+32%)	526 (+11%)	646 (+23%)	621(-4%)
Turnaround Time (Total days submission to completion)	83 (-31%)	66.4 (-20%)	56.9 (-14%)	34.7 (-39%)
Case submissions	448 (+24%)	549 (+23%)	622 (+13%)	592 (-5%)
Staffing (full-time casework)	5.25(+22%)	5 (-5%)	6 (+20%)	5.6 (-3%)

In summary, during 2019, the DNA laboratory received 5% fewer cases than were submitted in 2018, but in the past 2 years, there has been an increase in the number of cases the DNA laboratory has received.

The number of cases completed by the DNA laboratory has kept pace with the number of case submission. The DNA laboratory has reduced overall TATs for casework. We hope to keep our backlog to a manageable number in the next year.

Data





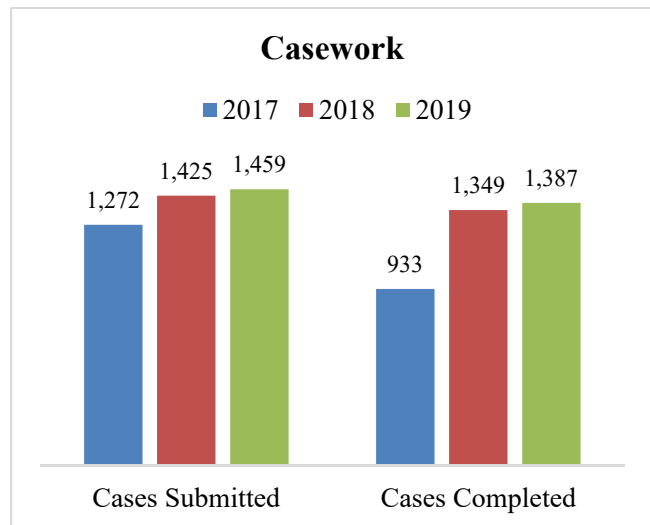
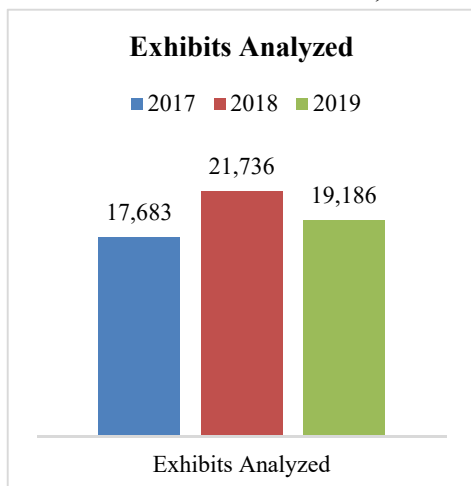
Forensic Chemistry

Overview

The Forensic Chemistry Unit (FCU) analyzes evidence submitted by Delaware law enforcement agencies for the presence of controlled substances. Controlled substances may be present in substrates such as powders, liquids, food products, oils, waxes, plant material, and both commercially produced pharmaceuticals and clandestine tablets or capsules. The FCU follows the Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) recommendations for confirmation of controlled substances by utilizing color tests, microscopy, logo identification, and Gas Chromatography/Mass Spectrometry (GC/MS). The FCU also follows an internationally accepted statistical sampling plan that allows the chemist to make an inference about a population by testing a sampling of exhibits with a 95% level of confidence. This sampling plan reduces the amount of time spent processing cases while providing conclusive results.

Casework and Accomplishments

The number of cases submitted to the FCU increased by 2.4% in 2019, from 1,425 cases in 2018 to 1,459 cases. Chemists in the FCU completed 1,387 cases in 2019, which is an increase of 2.8% from 2018 (1,349 cases). Although there was a slight rise in number of cases submitted and completed, there was an 11.7% decrease in the number of exhibits analyzed. (21,736 exhibits in 2018 vs. 19,186 in 2019). This decrease may be due to a decrease in the number of complex cases submitted to the FCU in 2019, with 15 cases of



1000+ exhibits

(30 in 2018), 2 cases of 5,000+ exhibits (6 in 2018) and 1 case of 10,000+ exhibits (2 cases in 2018) submitted for analysis.

In addition to timely and efficient case processing, the FCU remains committed to community outreach, and participated in career fair presentations for Wilmington University and the Delaware State Police. The FCU was also integral to the passage of legislation which permanently schedules any fentanyl as a

Schedule I controlled substance in Delaware. Always striving to gain knowledge, members of the FCU attended the Mid-Atlantic Association of Forensic Scientists in 2019 in Morgantown, West Virginia. The FCU also actively participated in the DFS Internal Audit, volunteering to audit the DNA Unit, Toxicology Unit, and DFS policies and procedures.

The Fire Debris Unit came on-line in April 2019 after a successful external accreditation. The unit temporarily suspended operations in September 2019 to focus on gaining additional knowledge in chromatograph pattern interpretation. With the continuing support of the Fire Marshal and the Bureau of Alcohol, Tobacco, Firearms, and Explosives, the Fire Debris Unit is on schedule to accept cases after the next external accreditation audit.

Staffing

The full complement of the Forensic Chemistry Unit is a Laboratory Manager II, Laboratory Manager I, eleven Forensic Analytical Chemists, and two Forensic Evidence Specialists. One chemist and one laboratory manager will be cross-trained in both controlled substances analysis and fire debris analysis.

The FCU underwent significant staffing changes in 2019. Four chemists resigned from state service, and one chemist transferred to another unit within DFS. One Forensic Evidence Specialist also transferred to a new unit. A Forensic Analytical Chemist I was promoted to Analytical Chemist II, increasing the complement of chemists able to perform peer review. The FCU was able to hire and train four Forensic Analytical Chemists in 2019, two of whom began casework in October, 2019, and two of whom are currently in training.

Despite significant changes to FCU staffing, the members of the FCU were able to continue to process cases from all Delaware Law Enforcement agencies. Fire Debris casework continues to be outsourced to private labs, but is expected to return to DFS in 2020.

Data

The following data displays testing completed by the Forensic Chemistry Unit in 2019. The FCU processes cases of varying complexity; a case may have one exhibit or thousands of exhibits. It is important to note that one exhibit may contain multiple controlled substances or may not contain any identifiable controlled substances. The data presented includes results from exhibits that have been tested and included in reports.

It is interesting to note that the FCU saw a decrease in confirmed Heroin, Marijuana, and Cocaine exhibits, but saw an increase in Fentanyl, fentalogues, MDMA, and Oxycodone exhibits, as well as exhibits which did not contain an identified controlled substance. The FCU also saw an increase in the

number of “other” confirmed controlled substances, such as Ketamine, Psilocin, Methylphenidate, and Zolpidem.

2019 saw an increase in the number of exhibits analyzed for the following substances:

Substances Found in an Increased Number of Exhibits in 2019			
Substance	2018	2019	Increase (2018-2019)
No Controlled Substance(s) Identified	296	789	166%
Oxycodone	122	143	17%
Fentanyl	10,551	11,546	9%
MDMA, etc.	6	109	1,717%
Benzodiazepines	86	164	91%
Other controlled substances	188	262	39%
Fentalogues	2,448	2,903	19%

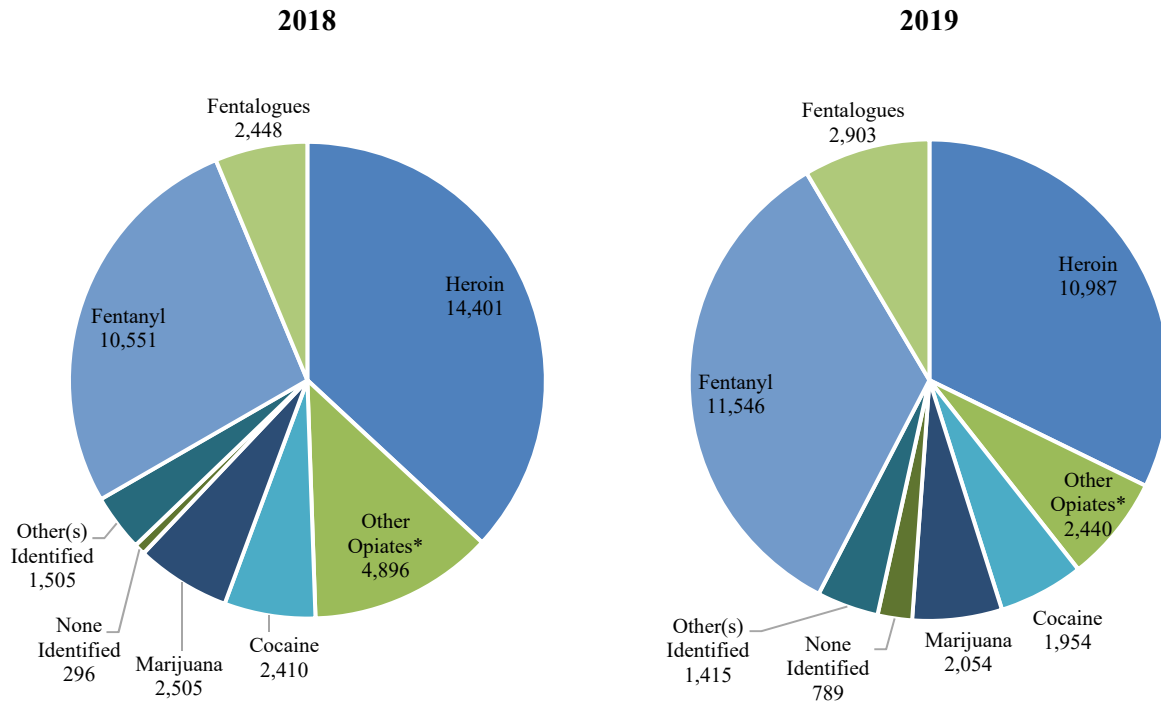
The FCU continues to track fentalogues, which are substances that have substitutions to the structure of Fentanyl. In 2019, 2903 fentalogues were reported, including Acetyl fentanyl, 4-methyl Fentanyl, and Valeryl fentanyl, which is an 18.6% increase from 2018 (2248 confirmed fentalogues).

The following substances were not seen as frequently in the FCU in 2018:

Substances Found in Fewer Exhibits in 2019			
Substance	2018	2019	Decrease (2018-2019)
Heroin	14,401	10,987	-24%
Other Opiates	4,774	2,297	-52%
Marijuana	2,505	2,054	-18%
Cocaine	2,410	1,954	-19%
Amphetamine	56	52	-7%
Methamphetamine	808	636	-21%
PCP	20	19	-5%
LSD	24	14	-42%
Synthetic Cannabinoids	141	50	-65%
Synthetic Cathinones	176	109	-38%

Controlled Substances Confirmed Positive

(Note that each exhibit may contain more than one drug.)



*Note that, for the purposes of the pie charts, oxycodone has been included under “other opiates.”

Conclusion

For answers to further questions, please see the DFS Website at <https://forensics.delaware.gov/>. Note that emails have also changed from “@state.de.us” to “@delaware.gov.”